Forest Landscape Handbook

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Foreword

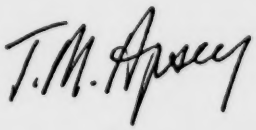
The Ministry of Forests has a broad mandate to manage forest, range and recreation values on the Crown lands of British Columbia.

In discharging this mandate the Ministry is giving an increasing emphasis to recreation management in its resource plans and programs. This is being done because public recreation enjoyment of Crown lands is an important social component in the socio-economic mosaic of integrated resource management.

The Ministry of Forests recognizes that scenic quality is a major factor in the public's enjoyment, for residents and visitors alike. This recognition will be reflected in Ministry resource plans and programs. At the same time we must deal with the reality that in a province heavily dependent on its forest products, and as rugged and mountainous as British Columbia, the evidence of logging activity cannot be hidden from view. Nor should we, except in special situations, try to do so. Rather, the Ministry objective will be to address the visual impacts of logging activity on the landscape and incorporate measures to harmonize such impacts.

The Forest Landscape Handbook addresses this objective. It is considered an important tool for the use of those involved in forest, range and recreation management. It is also recommended as a reference source to the wider audience which is interested in the scenic quality of the managed landscapes of the Province.

T. M. Waterland,
Minister.



T. M. Apsey,
Deputy Minister.

Acknowledgement

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The U.S. Forest Service pioneered many of the principles and concepts of Forest Landscape Management. This has resulted in the publication of their National Forest Landscape Management Series and other related publications. Grateful acknowledgement is made for permission to utilize portions of this information.

All the photographs used depict British Columbia forest scenes. The majority of these were produced by the Ministry of Forests. A small number were obtained from a variety of other sources and these are gratefully acknowledged.

The handbook was produced by the Recreation Management Branch of the Ministry of Forests.

H. N. Marshall
Director, Recreation Management Branch.

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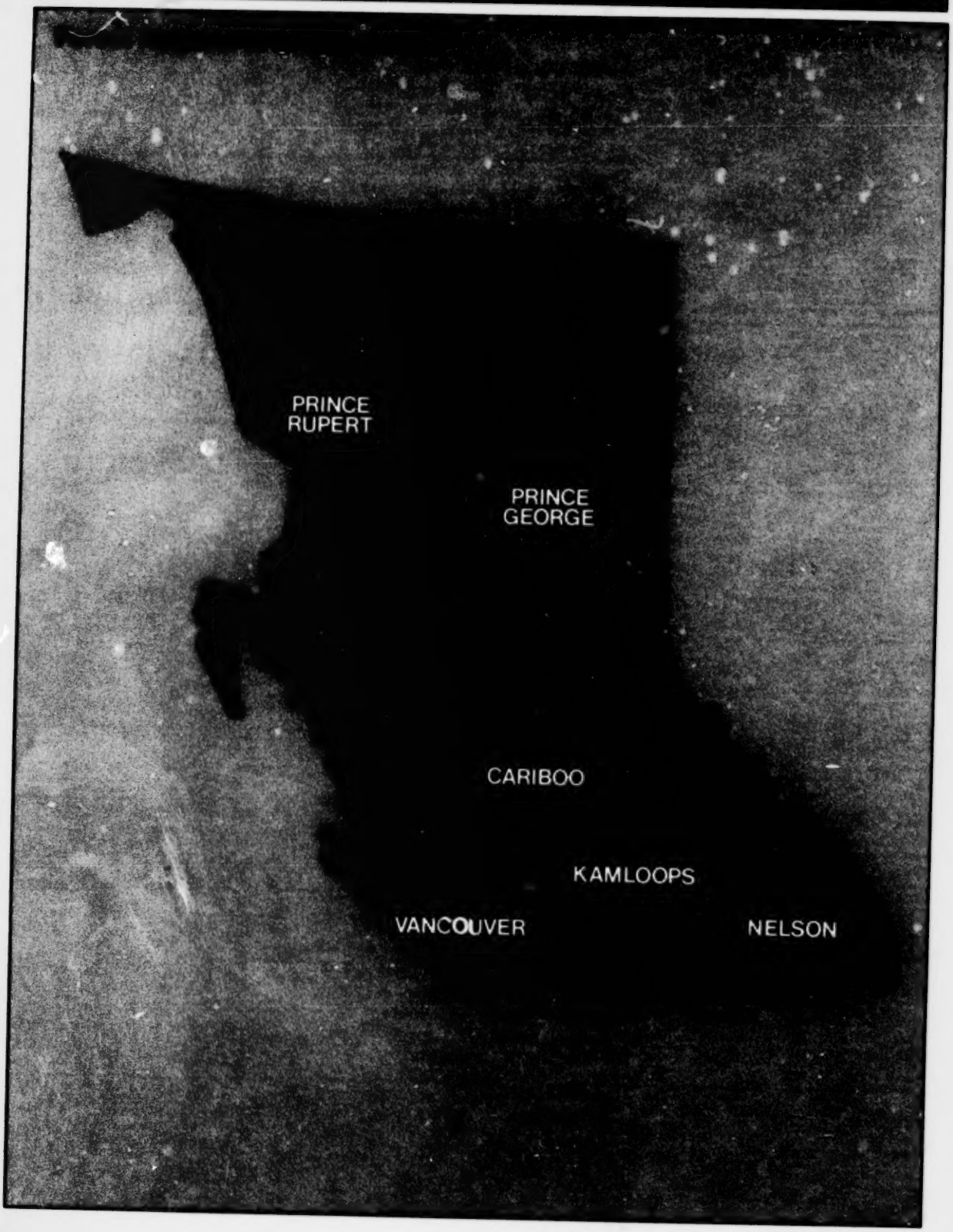

PRINCE
RUPERT
PRINCE
GEORGE
CARIBOO
KAMLOOPS
VANCOUVER
NELSON

Introduction

The motto, "Beautiful British Columbia," describes in one brief phrase the natural appeal of the province to both residents and visitors alike. The phrase is, however, more than a simple description; it suggests the existence of a natural heritage, the protection of which will challenge the forest manager in the 1980's. The challenge is to maintain acceptable forest landscapes and, at the same time, ensure that optimum economic and social benefits accrue to the people of the province. This will be no easy task. However, the Ministry of Forests has accepted the challenge and has committed itself to the introduction and application of effective landscape management principles. This handbook is an expression of that commitment. It was prepared with certain purposes in mind: namely, to establish the concept of forest landscape as an integral component of British Columbia's forests and range lands policies and to outline the benefits of forest landscape management concepts and practices. At the same time, the handbook provides a guide which illustrates these concepts and techniques and their application to integrated resource use management in B.C.

The handbook is divided into two parts. Part I may be useful for those who wish to inform themselves in a general way about basic forest landscape concepts. Part II is directed primarily to those persons responsible for implementing landscape management practices, for example: forest officers, industry foresters, and forest engineers and technicians.

The user of this handbook will quickly learn that forest landscapes are an important part of our total environment. Forest landscapes fall into two categories: *natural landscapes* and *modified landscapes*, which are influenced by man. This handbook is primarily concerned with modified forest landscapes. Hopefully, this book will make a significant contribution to a consciousness-raising process and will lead to the inclusion of aesthetic considerations in resource management. As Thoreau said "... even the longest journey begins with a single step..."

Ministry of Forests - Landscape Goal and Objectives

The Ministry of Forests recognizes the important role of forest landscapes in providing social benefits to the people of British Columbia. Accordingly, the Ministry has adopted the following goal for the management of landscape values:

"to retain or enhance forest landscape values in keeping with the concepts and principles of integrated resource management."

Objectives:

- To identify and inventory areas where forest landscapes have aesthetic importance.
- To incorporate forest landscape considerations as a component of integrated resource planning.
- To institute landscape management practices as integral components of forest resource management.
- To conduct and encourage training programs for Ministry and forest industry personnel which raise awareness, develop expertise and promote consistent application of landscape management principles and practices.
- To recognize the forest industry's major influence in landscape modification and to require the industry's participation in planning and operational implementation of forest landscape management principles in areas of aesthetic importance.
- To promote awareness of landscape values and to solicit the participation of public and private agencies in landscape issues and concerns.

The Ministry will support and implement these objectives by establishing a formal Provincial Landscape Management Policy to be included in the Ministry Policy Manual.

Part I:
The Forest Landscape

Fundamental Elements and Factors

The following elements and factors are inherent in landscapes:

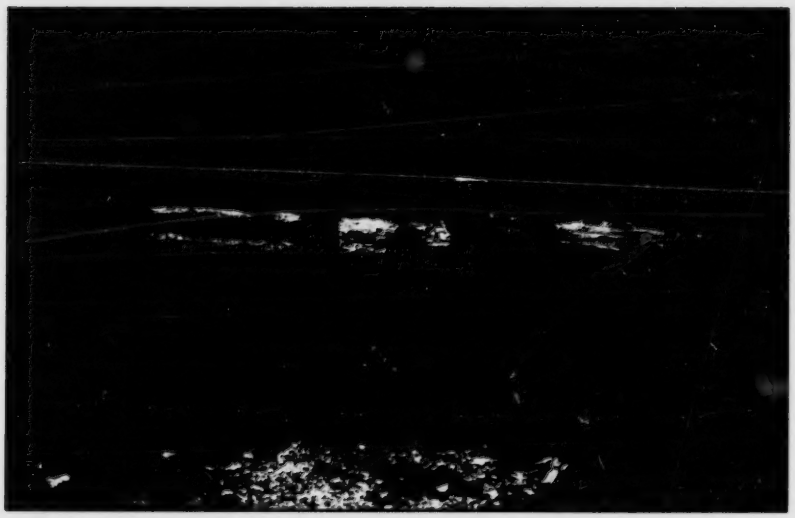
Landscape Character

There are many varieties of landscapes, but each has an individual character which is created by combinations of features – land, vegetation, water and structures. Also the scale of a landscape influences its character.

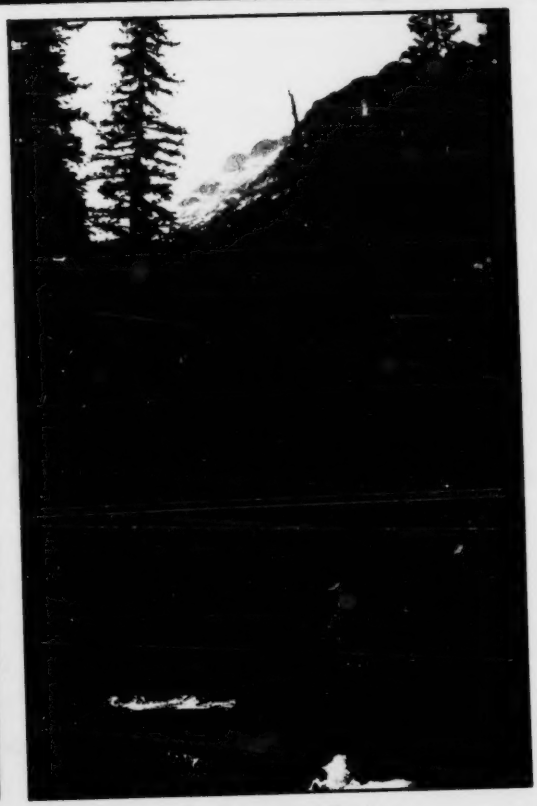
Landscapes can be large, providing panoramic views, or small, yet full of detail, some landscapes are dominated by a single feature, while others enclose streams and focal points. In British Columbia, landscapes are often related to lake shores and coastal waters.

Columbia Valley, Nelson Region.
Large panoramic landscape.

Cowichan Valley, Vancouver Region.
Small landscape, full of detail.



White River, Nelson Region. *Landscape dominated by a single feature (white canyon walls).*



Nahatlatch River, Vancouver Region. *Landscape encloses a stream and focal point.*

Howe Sound, Vancouver Region. *Water and shorelines are important components of many B.C. landscapes.*

Variety

Mountains, plateaus, coastal waterways, streams and lakes contribute to the great variety of British Columbia landscapes. So too does the great range of local vegetation. Natural catastrophies such as slides, burns and insect infestations as well as urban, industrial, forest and agricultural developments add further variety and modification. The following photographs illustrate some of this variety.

Kootenay Lake, Nelson Region. *Land/water interface, forest cover.*

Vancouver Region. *Colour, texture, forest development.*

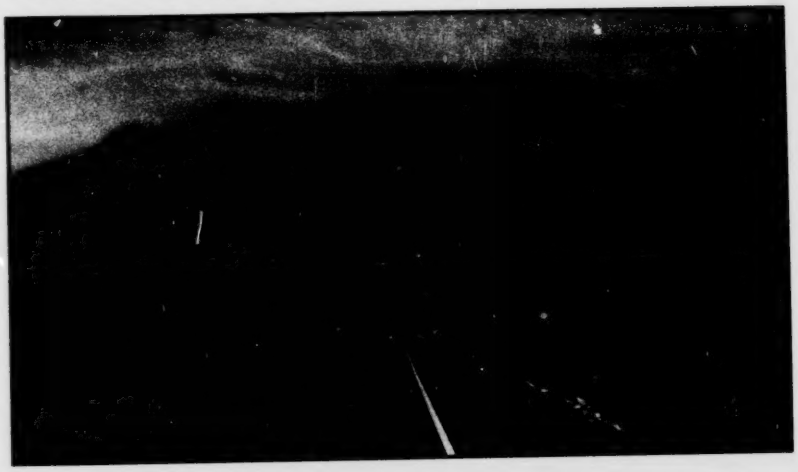
McBride, Prince George Region. *Mountains, forest cover, agricultural development, community, colour.*

Change

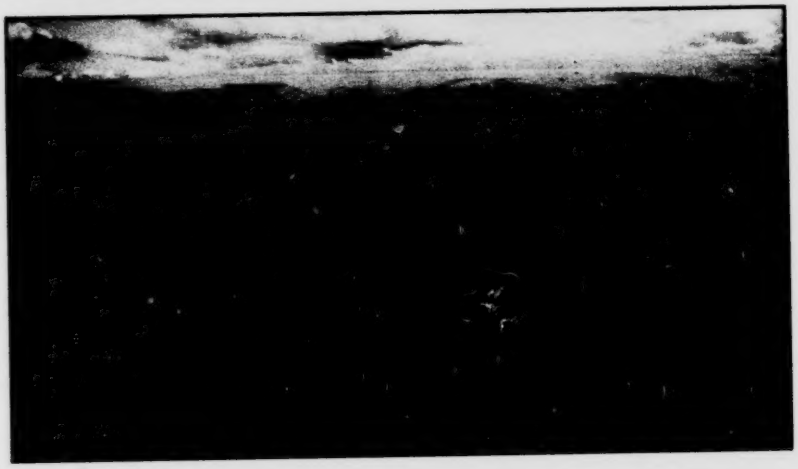
The most significant changes in the forest landscape are caused by man.

These illustrations show that some changes are barely visible (top), others are more dramatic (middle), and many blend well with the characteristic landscape (bottom).

Woss, Vancouver Region. *Logging followed by forest regeneration on the hillside.*



Near Adams Lake, Kamloops Region. *Repetitive clearcut pattern.*



Prince Rupert Region. *Cutblock boundboundaries run more or less parallel with the dominant ridgeline and thus blend in the landscape.*

Dominant Elements

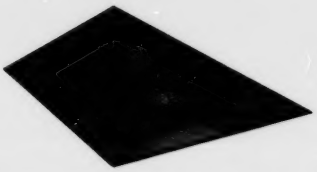
Four elements compete for dominance in landscapes. The elements are:

Form · Line · Colour · Texture

They are called dominant elements to indicate their visual importance as well as relative strength within a landscape.

The following photographs illustrate these elements.

Form is three-dimensional and indicates the mass of an object, e.g. landform, mountain, hill, ridge. When seen in only two dimensions it is called *shape,* e.g. background scenes, cutblocks in the distance.



Line is one-dimensional, it can make up the silhouette of form or is considered separately, e.g. ridgelines, timberlines, shorelines, tree trunks.

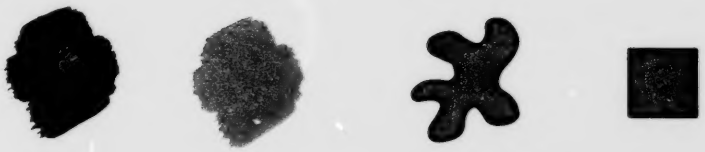
Golden, Nelson Region

When observed at short distances, both **Colour and Texture** are distinct and pronounced (foreground); they also highlight other landscape components. With increasing distance, texture becomes less distinct and colours merge into a bluish haze.

Johnstone Strait, Vancouver Region

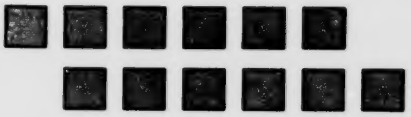
The dominance of a given element is emphasized by:

Contrast



In colour *In form*

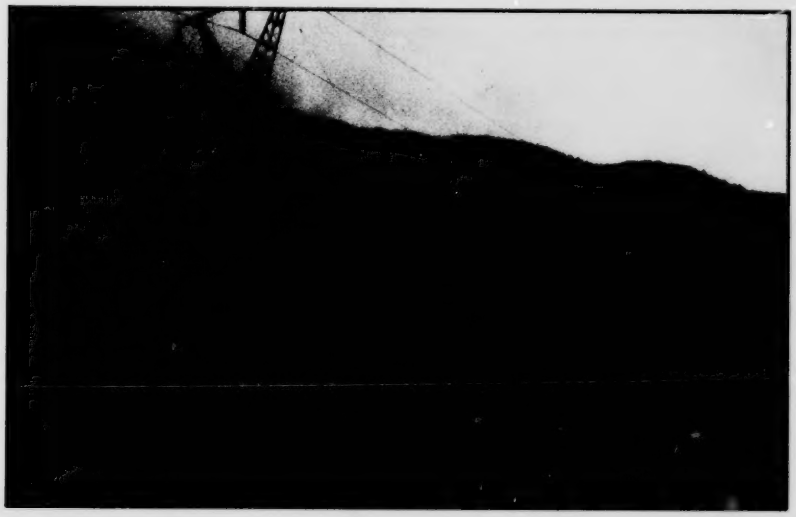
Repetition



Sequence

Focus on a Special Feature

This picture focusses attention on two features – the pole and the logged area.



Nass Valley, Prince Rupert Region.

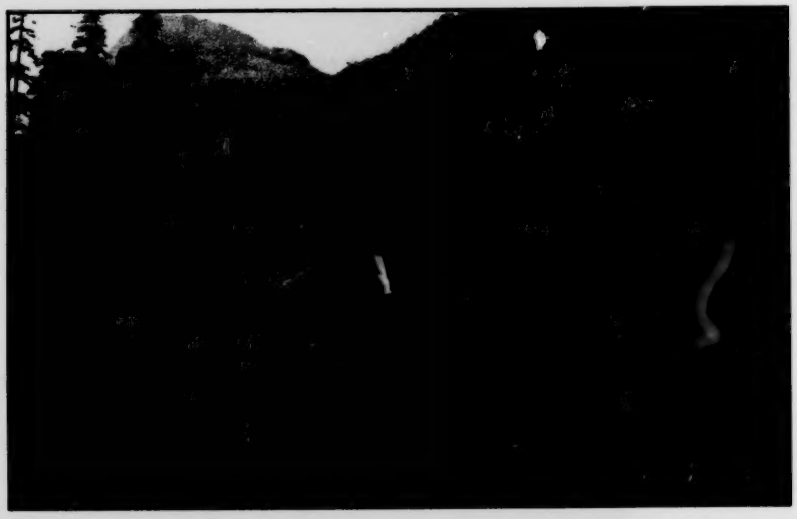
Variable Factors

The forest manager has little control over the variable factors which influence the way a viewer sees a landscape. These variable factors are:

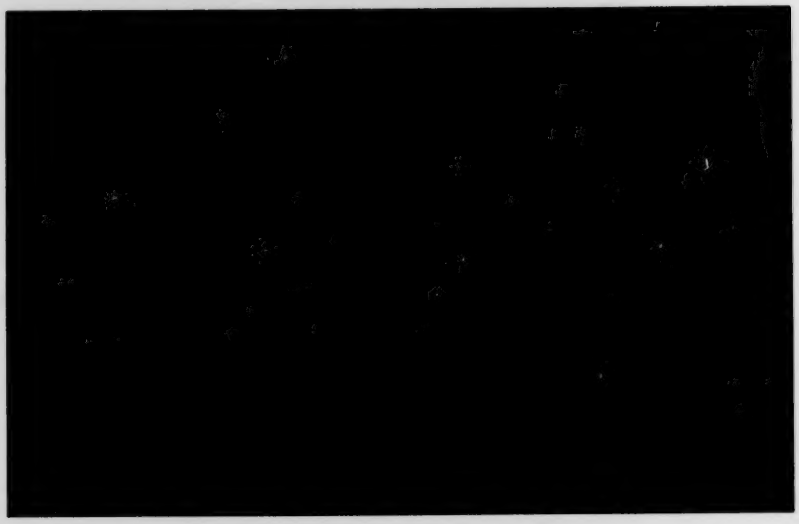
- season, weather and light conditions
- motion and duration of viewing
- screening effect of forest cover
- observer position
- observer distance

Degree of slope determines how much is seen of a landscape:
- steep slopes increase visibility
- gentle slopes reduce visibility

Season, Weather and Light Conditions



Vancouver Region.
Morning shade may change to bright light in the afternoon and vice versa.



Daisy Lake, Vancouver Region.
Summer, foggy.

Same location. Winter, clear.

Motion and Duration of Viewing

Static Viewing.

Mobile Viewing – often of short duration.

Screening Effect of Forest Cover

Forest cover can provide a physical barrier which screens the landscape from the viewer.

Fig. 1. *No forest cover: no screen.*

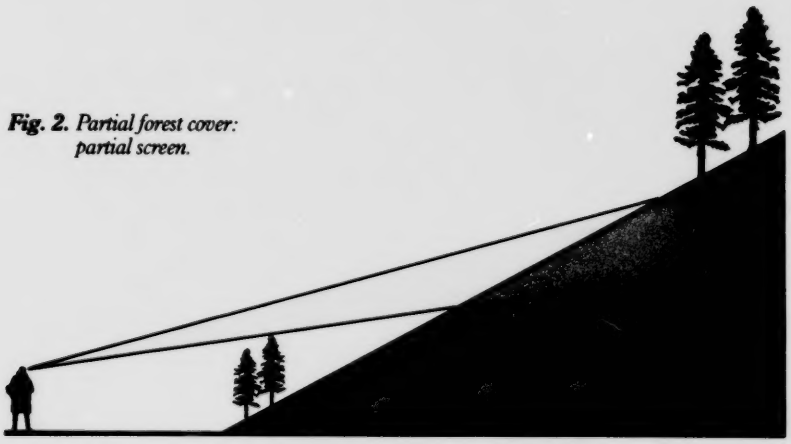


Fig. 2. *Partial forest cover: partial screen.*

Fig. 3. *Total forest cover: total screen.*

Observer Position

Lateral

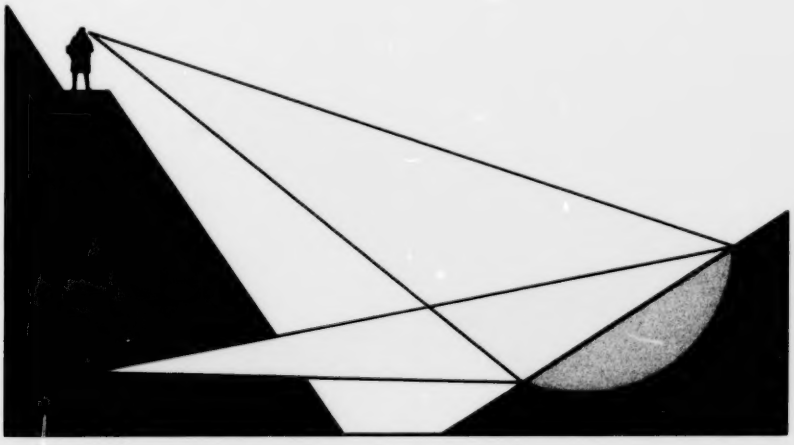
The upper boundary of the cutblock is seen from one position as a gentle curving line; from another position (lower photograph) the same boundary is seen as a straight line.

Prince George Region.

Observer Position

Vertical

The logged area appears larger when seen from the higher position.



Observer Distance

Close up: *Much detail is seen.*
At Distance: *Detail blends together.*

Horsefly, Cariboo Region.

Visual Impacts

The visual impact of a landscape is affected by both **natural** and **man-made** phenomena. Some effects are more dramatic than others; all influence what we see in the landscape.

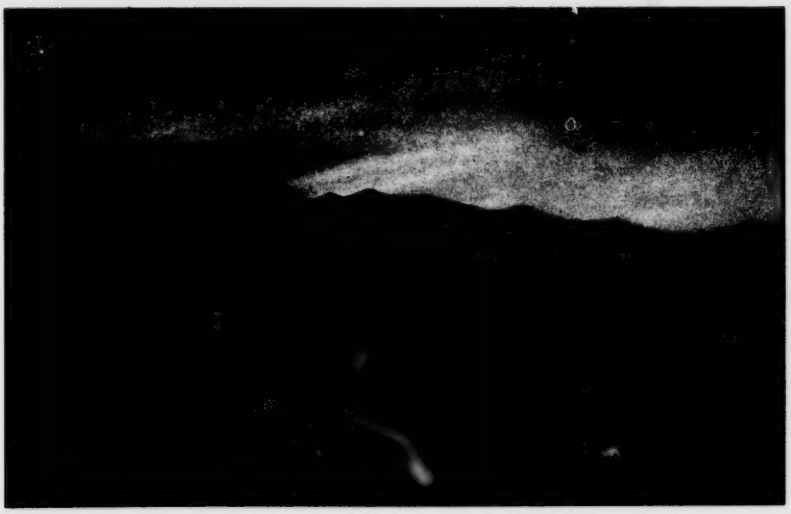
Natural Phenomena

In British Columbia we can observe many examples of natural phenomena, each of which creates a visual impact on the forest landscape.

- Heavy precipitation and run-off in areas of unstable soil frequently cause landslides; it also leads to high stream flow, which can cause erosion, sedimentation and vegetation damage along stream banks.
- Insects and disease cause death or damage to the forest resulting in discolouration of large areas.
- Fire, caused by lightning, destroys forest and range vegetation.
- Wind can break standing trees but more often causes windthrow following soil saturating rains and along exposed forest edges.

Nahmint River, Vancouver Region. *Steep topography, rainfall, unstable soils and gravity cause slides.*

Gun Lake, Kamloops Region. *Insect infestations result in damaged and dying forests and are often followed by devastating fires that affect the visual character of B.C.'s forest landscapes.*



Manning Park, Vancouver Region.
Burned forests, resulting from lightning strikes have a visual impact on, but also contribute to B.C.'s characteristic landscapes.

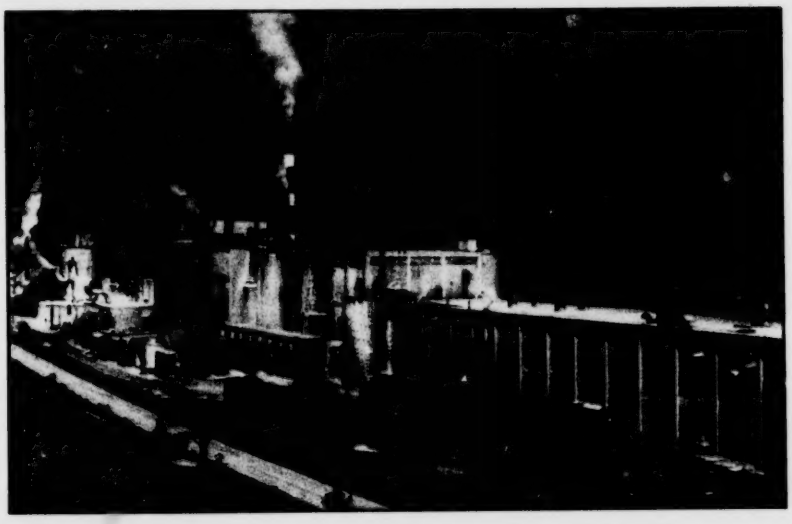
Man-made Phenomena

The actions of man have an important influence on the visual character of the forest landscape, particularly in valley bottoms and travel corridors. Man-made phenomena include:

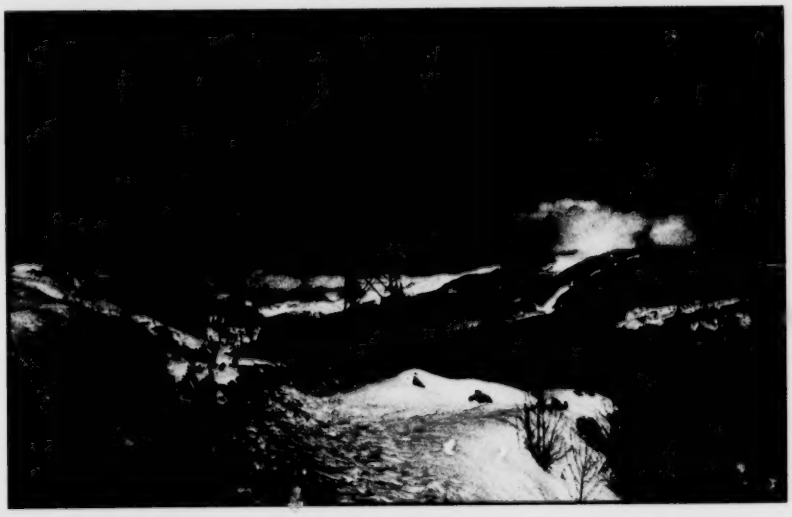
- logging and silvicultural practices
- agricultural land and developed pasture
- fires, i.e. neglect, arson, slashburn escape
- communities, both urban and rural
- industrial plants and mining activities
- transportation systems such as highways, roads and railways
- dams and reservoirs
- utilities (power, gas and telecommunications) and related rights-of-way.

Vanderhoof, Prince George Region.
Agricultural development.

Castlegar, Nelson Region. *Industry and railroads.*



Whistler, Vancouver Region. *Highway, powerline, logging, ski developments.*



Because of the predominance of forest development throughout the province, forest management activities have had a particularly dramatic influence on the visual character of British Columbia landscapes. The impact of forest management is caused primarily by:

- **logging roads** which create strong linear and colour contrasts in the landscape
- **logged areas** of varying shapes and sizes and at different stages of forest regeneration (i.e. green-up)
- **logging and silvicultural practices**

Graham Island, Prince Rupert Region. *The upper and middle photographs indicate that the visual impact of logging varies with location, design and season.*

Blue River, Kamloops Region

Franklin River, Vancouver Region. *Good forest management, together with early and successful green-up, will always mitigate the visual impact of logging activities. (For description of green-up, see Part II Step 4, Logging and Silvicultural Practices, page 56).*

Perceptions

Perception of a landscape – the process of awareness and interpretation of what is seen and experienced – is influenced by physical factors and by human factors such as emotion and intellect.

Appreciation of the undisturbed beauty of the natural forest landscape, personal philosophy and the awareness of economic needs are all key factors which influence attitudes to modification of a forest landscape. The mystique of the undisturbed forest is a major influence on the way all forest landscapes are perceived, particularly those which have been affected by the impact of roads and logged areas. In general, people tend to prefer natural forest landscapes to those modified by man; on the other hand, many people in British Columbia are aware of the need to use forest resources since the forest industry is the backbone of our economy.

People perceive forest landscapes differently, for example:

- Loggers, their families and those in small communities who derive their living from the woods are usually ready to accept the logging environment on which their economy is based;
- those with a single interest may support either extreme of total preservation or total modification of landscapes as a means of achieving their own objective;
- many citizens not directly involved with logging are concerned about its impact on the landscape; however, these same people may accept the need for forest use but demand improved forest management practices;
- visitors from other parts of Canada, the United States and the world, impressed by the size of the land, its forests, mountains and wilderness tend to be critical of the impact of logging on the landscape.

In summary, there are as many perceptions of landscapes as there are viewers – no two persons see a landscape in exactly the same way.

It is important to be aware of people's perceptions since these play a major role in the application of the procedures outlined in Part II of the handbook.

Part II:
Forest Landscape Management: Techniques and Practices

Introduction

This part of the handbook provides the forest manager with helpful tools for making practical decisions, particularly in visually sensitive areas.

In most areas of British Columbia, modified forest landscapes occur as a result of logging. The location of roads and the layout of cutblocks are governed by timber availablity, economic choices, logging technology and environmental considerations. Cutblocks, areas of selective logging and deferred areas, together with natural features, create the mosaic which is typical of a managed forest landscape. Because of their biological complexity, forest landscapes are subject to varying degrees of green-up, resulting in continuous changes of colour and texture.

The goal of landscape management is to insure that modifications are compatible with existing landscapes. To promote this objective, the Ministry of Forests has developed a method of step-by-step implementation. In Step 1, Landscape Inventory, the visible areas, their landscape features and their sensitivity are discussed. This is followed by Step 2, Detailed Landscape Analysis, in which site specific details are evaluated and visual quality objectives established in order to arrive at a landscape management decision. Step 3, Design and layout and Step 4, Logging and Silvicultural Practices deal with the implementation of practices which affect the forest landscape. Step 5, Follow-up, refers to post-development evaluation.

This step-by-step approach is sufficiently flexible to be applied either in part (e.g. inventory only) or in whole (e.g. Steps 1 through 5) and in varying degrees – from a brief review to an extensive and detailed evaluation. How intensively a manager chooses to apply the process will depend on the sensitivity of the situation.

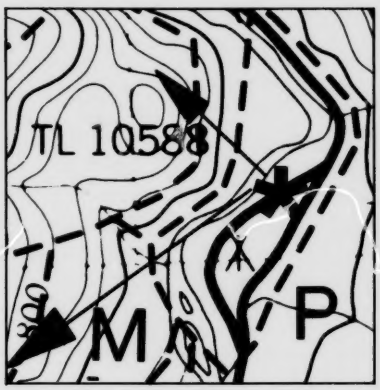
Implementation Overview

Step 1:
Landscape Inventory

Mapping of the visible landscape, its features and sensitivities, for the purpose of overall planning.

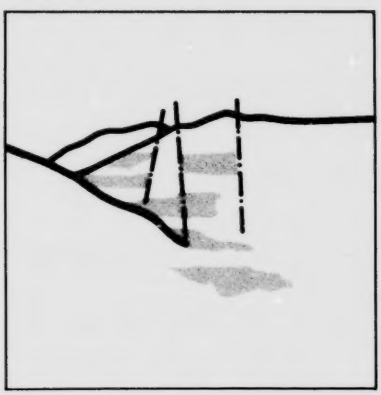
Step 2:
Detailed Landscape Analysis

Mapping of further landscape detail and selecting visual quality objectives that will determine landscape management decisions.



Step 3:
Design and Layout

Development of designs which blend with landscape characteristics and meet the selected visual quality objectives.



Step 4:
Logging and Silvicultural Practices

Implementation of road building, logging and silvicultural practices which complement the visual quality objectives and the corresponding designs.

Step 5:
Follow-up

Asking questions: did this management activity leave an acceptable landscape? Did special measures reach desired results? Should examples be published?

Step 1
Landscape Inventory

A Landscape Inventory allows the manager to identify three broad elements:

1. The Visible Landscape

2. Landscape Features

3. Landscape Sensitivity

The information obtained through a Landscape Inventory will be the basis of future landscape management decisions. The inventory process, as outlined here, assures uniformity of content and standards across the province, yet allows the flexibility which is required because of differing circumstances. (The process can be limited to one or more steps taken in sequence or combined together – see Map 1, Landscape Inventory, page 32).

1. The Visible Landscape

The boundary of the visible landscape is plotted on a map which shows the landscape as it is seen from different locations, such as:

- **travel routes or corridors** – land based: roads and railways water based: lakes, rivers and coastal waters
- **communities** – both large and small
- **areas of extensive public use** – parks, forest recreation sites, lakeshores, trails, ski hills, viewpoints, etc.

2. Landscape Features

Prominent, large landscape features and/or distinctive, small features can be indicated on the map with arrows. It is also important to map specific viewpoints, often man-made, which provide opportunities for static viewing. The following list indicates landscape features that may be part of a Landscape Inventory.

Natural Features:

- ***Vistas, views and focal areas, both large and small.*** *These are of particular importance if they can be seen for a long time while travelling a straight road or standing at a viewpoint, campsite, etc.*
- ***Land/water interface.*** *These areas are sensitive because they are extensively used and usually present interesting variety and contrast.*
- ***Specific features.*** *Potential recreation sites, streams or selected portions of streams (e.g. waterfalls), topographical, geological and/or botanical areas of visual or educational interest.*

Man-made features

- ***Historic and archeological sites.***
- ***Industrial installations.*** *Mills, factories, bridges, dam sites, open pit mines, etc.*
- ***Agricultural developments.*** *Farmlands, orchards, farm buildings, etc.*
- ***Logging and silvicultural practices.***
- ***Recreation oriented developments.*** *Recreation sites, commercial developments.*
- ***Settlements.*** *Urban, rural.*

3. Landscape Sensitivity

In order to rate the relative importance of the features identified in a Landscape Inventory and to use the information in a planning process, a measure of landscape sensitivity is needed. It is necessary to make an initial judgement about sensitivity when considering any form of forest development.

Sensitivity levels are a measure of people's concern for the scenic quality of landscapes.

How is sensitivity mapped and measured?

The visible landscape as shown on a Landscape Inventory map is divided into broad Landscape Units which are identified on the basis of their individual sensitivity when seen from one or more viewpoints. The person doing the survey assesses the degree of sensitivity of each unit, according to the relative importance of the following considerations.

Physical Factors

- Landform – diversity, outstanding rock features, exposed peaks and ridges
- Vegetation – pattern diversity, natural openings, continuity
- Water – land/water interface, stream values, lakes, waterfalls
- Influence of Adjacent Scenery – distinct vistas
- Uniqueness or Scarcity – dominant or interesting feature, or combination of features
- Cultural Modifications – farm and range land, urban development, structures, roads, railways, power-lines, logging patterns.

Viewer-Related Factors

- Number of viewers
- Viewing Distance
- Viewing Duration
- Viewing Angle (horizontal)
- Observer Position (vertical)
- Sequence
- Viewer Perception. (See Part I – Perceptions).

A high, medium or low sensitivity level for each Landscape Unit can be indicated by assigning the letters H, M and L as shown on Map 1.

Appendix 1 describes the Identification of Viewpoints and Visible Area Plotting Techniques.

Mapping

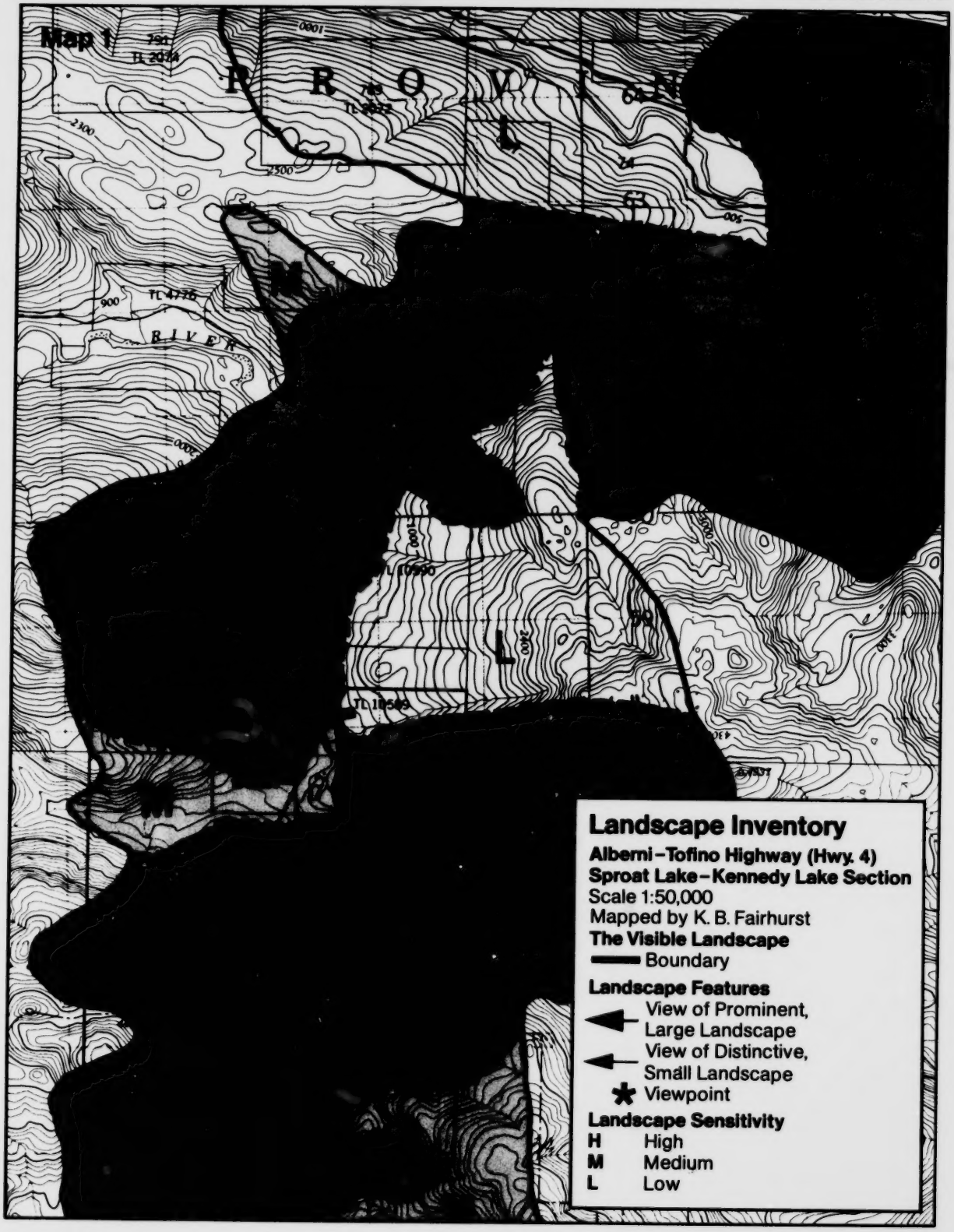
Managers may select a map scale and inventory unit size that suits a particular need or degree of inventory detail. As a guide, the Timber Supply Area (T.S.A.) or Tree Farm Licence (T.F.L.) unit may be effectively inventoried at a scale of 1:125,000 and resource folios and small units at a scale of 1:50,000.

Map 1 is an example of a Landscape Inventory in the Port Alberni Forest District. The map scale chosen for this particular road corridor is 1:50,000. The suggested standardized legend is suitable for province-wide use, but the legend can also be expanded to reflect local conditions.

If landscape units are coloured, it is recommended that shades of grey be used which cause little interference with most other colour schemes.

Summary

Step 1, Landscape Inventory, assists the manager with the overall planning process by providing a map of the visible area and its important features and an evaluation of their sensitivity. For guidance in planning actual forest operations and arriving at landscape management decisions, refer to Step 2, Detailed Landscape Analysis.


Map 1
R R O V L
RIVER
TL 4775
TL 10569
Landscape Inventory
Alberni–Tofino Highway (Hwy. 4)
Sproat Lake–Kennedy Lake Section
Scale 1:50,000
Mapped by K. B. Fairhurst
The Visible Landscape
Boundary
Landscape Features
View of Prominent, Large Landscape
View of Distinctive, Small Landscape
Viewpoint
Landscape Sensitivity
H High
M Medium
L Low

Step 2
Detailed Landscape Analysis

This section explains how detailed mapping and the use of visual quality objectives lead to landscape management decisions.

A. Detailed Mapping

When actual forest operations are considered within the visible landscape as established in Step 1, detailed mapping, which is an intensification of the inventory process, may be necessary. This can involve one or more individual Landscape Units, depending on the size and scope of the planned operations. A detailed analysis should be initiated primarily in Landscape Units with High and Medium sensitivity ratings, or as the situation warrants. The Detailed Landscape Analysis provides the manager with a map which shows the areas which are visible from selected viewpoints. (See Map 2, Detailed Landscape Analysis, page 34).

Appendix 1 describes the Identification of Viewpoints and Visible Area Plotting Techniques, which can be applied at a detailed level of analysis.

B. Visual Quality Objectives

At this point several questions can be asked.

- Should parts of a landscape be preserved?
- Can a landscape retain its character while logging takes place?
- Is modification of a landscape through road building, logging and subsequent new tree growth acceptable?

These questions indicate the need to establish criteria which, in landscape management terms, are called: Visual Quality Objectives, or in short: VQO's.

Appendix 2 defines Visual Quality Objectives (VQO's) and gives illustrations. It is important to study this Appendix because it outlines the different degrees of landscape alteration and their related management activities.

The manager should select the most appropriate and attainable VQO on the basis of the landscape's existing visual quality and viewer-related factors such as:

- attractiveness related to other values; a landscape is often considered attractive when it has variety.
- importance of focal areas and/or specific features in the landscape.
- uniqueness in the sense of having special qualities relative to the area.

Map 2, Detailed Landscape Analysis, shows the selected VQO's for a part of Map 1, enlarged to an operational scale of 1:20,000.

C. Landscape Management Decision

In making the actual Landscape Management Decision the manager has to weigh the assigned Visual Quality Objectives against other values and considerations. He has to accept or modify the VQO and make sure that it is realistically attainable. Factors to be considered are:

1. Long Term Economic Values

- Importance of consumptive industrial demands on the resources of the area. e.g. logging, mining, dams, reservoirs, powerlines.
- Relative value of non-consumptive demands, e.g. tourism, ancillary industry.

2. Social concerns (See Part I – Visual Impact, Perceptions)

- Numbers of people visually exposed to the landscape.
- Types of people: residents and local workers versus visitors and recreationists.
- Attitudes of the people: local prejudices and concerns, organized lobby, attitudes, demands for public involvement.

3. Visual Absorption Capability (or VAC)

The Visual Absorption Capability is the ability of a landscape to absorb or hide changes. Factors that influence this are:

- physical characteristics such as slope, vegetation, natural openings, distance, landforms, soil, aspect.
- man-made alterations such as farm and developed pasture, urban areas, roads and railways, powerlines, structures, patterns caused by logging.

Appendix 4 describes the Visual Absorption Capability in further detail.

As an aid to the manager, Table 1, page 35, illustrates how Landscape Sensitivity relates to a range of VQO's and their associated Management activities.

Summary

Step 2, Detailed Landscape Analysis leads to a landscape management decision.

Step 3, Design and Lay-out, deals with implementation.

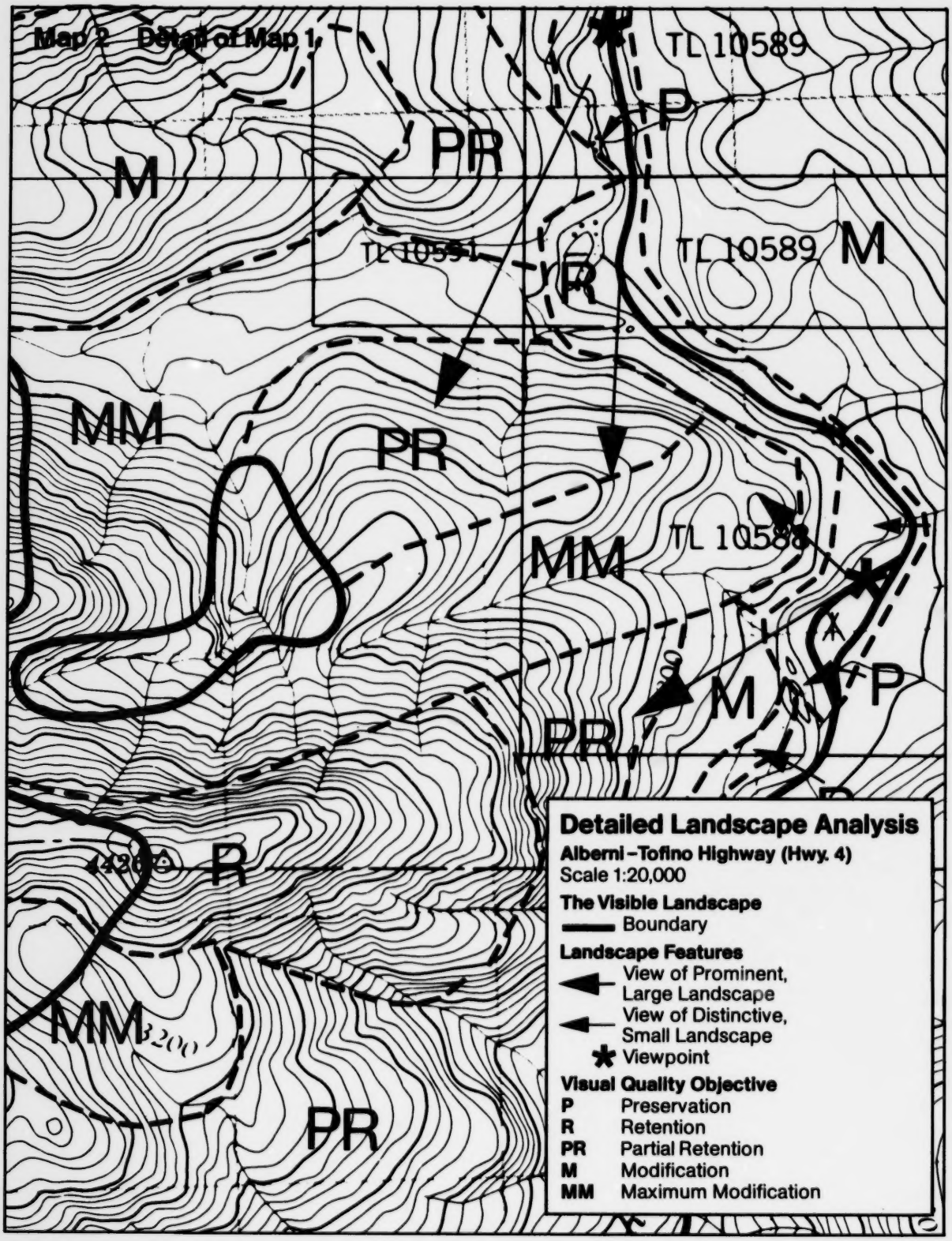
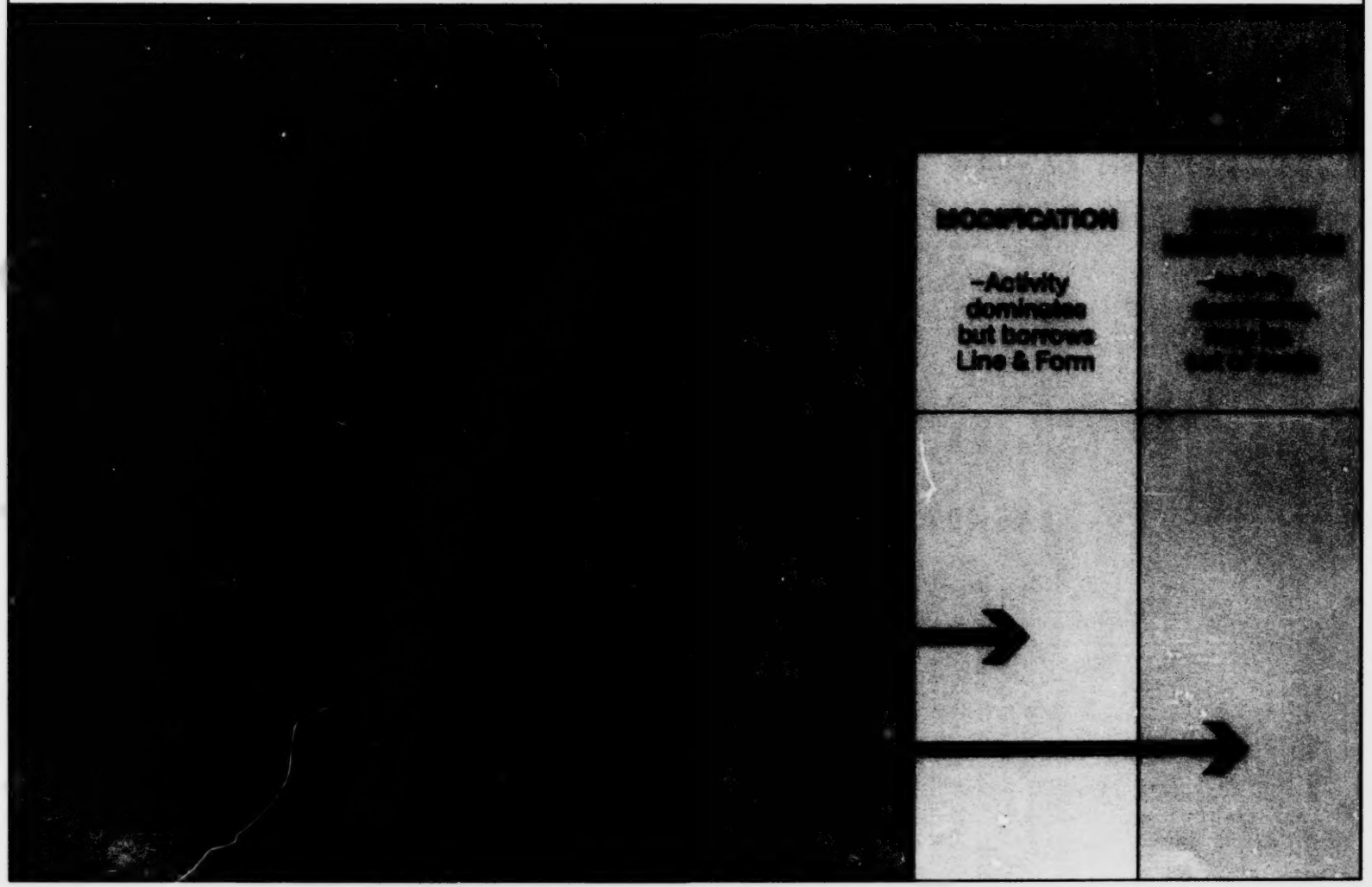

Map 2 Detail of Map 1
TL 10589
P
PR
M
TL 10589
M
TL 10551
R
MM
PR
MM
TL 10588
M
P
PR
R
MM
PR
Detailed Landscape Analysis
Alberni–Tofino Highway (Hwy. 4)
Scale 1:20,000
The Visible Landscape
Boundary
Landscape Features
View of Prominent, Large Landscape
View of Distinctive, Small Landscape
Viewpoint
Visual Quality Objective
P Preservation
R Retention
PR Partial Retention
M Modification
MM Maximum Modification

TABLE 1

Relationship of Landscape Sensitivity and Visual Quality Objectives



Step 3
Design and Lay-out

The design of roads and cutblocks and their lay-out should reduce the adverse visual impact associated with road building and logging. The impact of these activities frequently depends upon people's perception of unnatural lines, shapes and forms within the landscape. At the same time it is essential that road and logging designs reflect economic considerations and attempt to avoid the creation of isolated fringe timber patches which may be difficult to harvest in the future.

The Design Process identifies the dominant elements in the landscape and aims to match (blend, repeat, parallel, etc.) roads and cutblocks with them in a manner in keeping with the selected VQO. The result will be more comfortable to the eye.

Experience has shown that the major dominant element in most British Columbia landscapes is line. Line dictates shape and form and is the basic element that can be most effectively manipulated by the forest manager. Other important dominant elements – colour and texture – are less readily manipulated for landscape purposes.

In the process of design and lay-out, awareness of the Visual Absorption Capability (VAC) of a landscape, already mentioned in Step 2, is most important. This applies in particular to the forest engineer and those involved with long term planning as well as operational lay-out. Key factors that determine VAC are natural physical characteristics and existing man-made alterations.

Natural Physical Characteristics

- Slope:
alterations on gentle slopes are hard to see.
- Vegetation:
forest cover can physically screen alterations or absorb them in areas of diverse colour and texture.
- Natural Openings:
cutblocks can blend with existing openings.
- Distance:
the further a landscape from a viewer the greater its ability to hide alteration.
- Landforms:
alterations are readily absorbed by diverse landforms.
- Soil:
changes to landscapes on darker soils are more easily absorbed.
- Aspect:
north exposures absorb alterations quickly due to more rapid green-up and the more frequent occurrence of shade.

Existing man-made alterations

- Farm and developed pasture
- Urban areas
- Roads and railways
- Powerlines
- Structures
- Patterns caused by logging.

Appendix 4 describes and illustrates Visual Absorption Capability (VAC) in further detail.

The importance of logging road design in the forest landscape is clearly illustrated in the following excerpts from an article in the *British Columbia Lumberman*, April 1979.

THE NATURAL LOOK
IS ON ITS WAY
by Brian Martin

The man who's building a logging road these days has an array of problems to keep in mind – not the least of which are environmental controls and restrictions.

In coming years, however, he may well have to concern himself with the aesthetics of what he is building – in other words, he may have to make logging roads look good as well as function properly.

At least, that's the opinion of Laszlo Adamovich, associate professor of forestry at the University of British Columbia.

"People will demand," he said, "that those roads should not interfere with the landscape in a way that will be a visual eye-sore."

The professor also makes a point of stating that he's quite aware the first and foremost purpose of a logging road is to get the logs out of the bush and down to the mill.

Logging roads, he states, "are nothing to be ashamed of if they are located or structured with that view in mind – that they should fit into the landscape."

He thinks it is important to educate loggers and foresters in road building methods that will result in a more eye-appealing construction.

One of the keys to the type of road he's talking about concerns following the natural contours of the landscape rather than slicing across them.

"The main thing," he says, "starts with the design of the road. You don't just put it there. You don't just tell the bulldozer operator, 'I have a landing over there and you should get to it!'"

The professor points out that when a logging road is built to be as short as possible it may mean doing a considerable amount of cutting and filling, which could be avoided if natural contours were followed. It is also very expensive.

"...Especially here on the coast," he says, "when it comes to rock – that is very expensive. And the road looks ugly and it creates a risk of slippage and so on."

As a result, he says, it may well be cheaper to go around a hill rather than cut through it or around a gully rather than fill it.

He does point out, though, it is not necessarily always cheaper to build aesthetically appealing logging roads.

"When it comes to things like slope stabilization – some of the seeding or mulching – there are extra costs," he says.

But, even here, he claims that when you remember construction costs, maintenance costs and hauling costs all have to be considered as a package in the long run, the economics might turn in his favor.

Industry reaction to aesthetic road design, Professor Adamovich admits, has been slow in coming. But, he says, coming it is.

Industry meetings where he has brought up the concept, says the professor, have resulted in lively discussions.

Design Implementation

After a review of design options, the manager selects the most appropriate one for a specific area. The design must be incorporated into the operational plan so as to match as far as possible the dominant elements in the landscape. Once the lay-out has been designed, the most logical and simple plotting technique should be used to transfer the design to operational maps for use in field implementation.

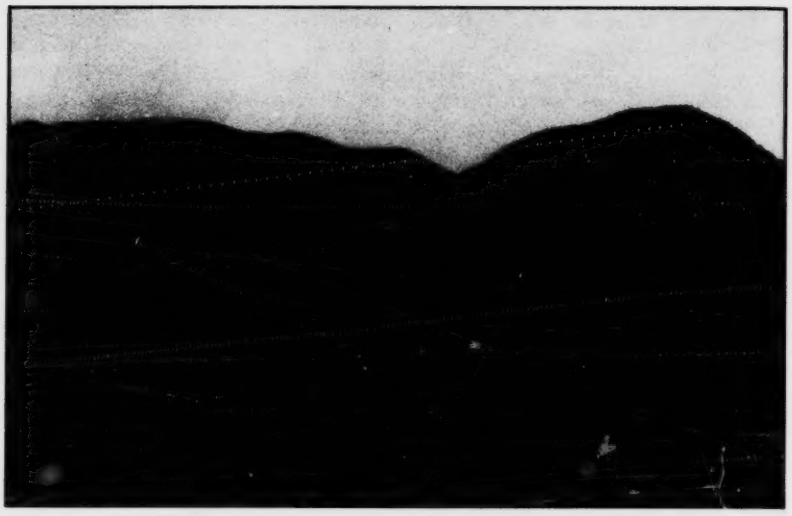
Appendix 3 describes Design Plotting Techniques.

Examples

The following illustrations show examples of logging and related activities in British Columbia. The captions refer to the existing and anticipated impact of these activities.

It is up to the reader and user of the handbook to judge the examples given and to apply the awareness gained in design and layout practices.

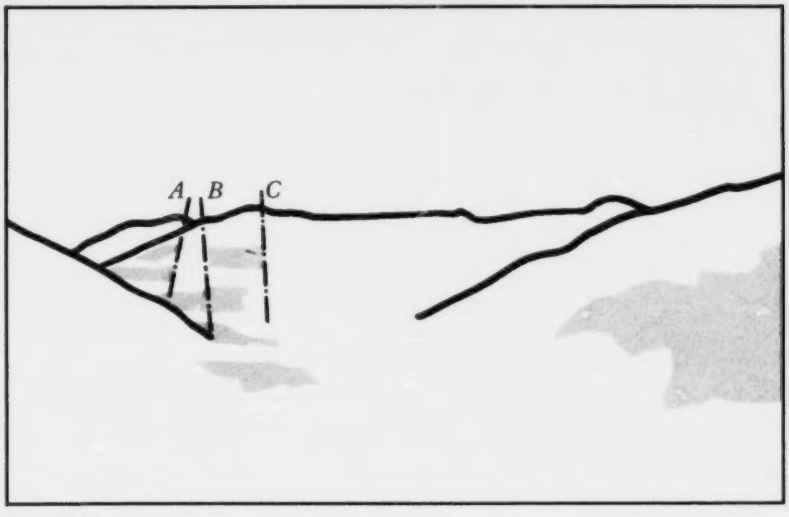
Uchucklesit Inlet, Vancouver Region.
This modification borrows form and shape from the natural landscape and is therefore comfortable to the eye.



Cutblock boundaries follow the dominant lines of the natural landscape.

Key to diagram:
Dominant lines seen in the natural landscape
Logged areas

Near Greenbush Lake, Kamloops Region. *Example of dramatic impact of checkerboard logging on the left compared to the relatively gentle impact of the cutblock on the right.*

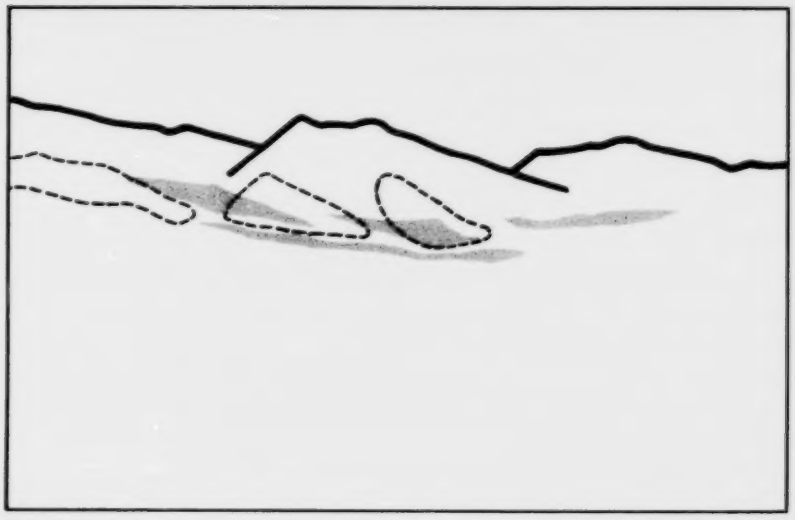


The straight lines A, B and C are at right angles to the dominant lines (green) of the natural landscape and the resulting sharp angles cause discomfort to the eye. Better blending of these lines would reduce the harshness of the angles.

Key to diagram:
Dominant lines in the natural landscape
Logged areas

Bulkley Valley, Prince Rupert Region. *The distinct impact of lines and angles in the two upper cutblocks dominates this attractive landscape. Contrasts in such areas of continuous dark forest cover are emphasized during long periods of winter snow cover. (See also Appendix 4 – Visual Absorption Capability).*

The impact could be modified by borrowing shapes from the natural landscape and by consciously avoiding sharp angles as indicated by the examples in the sketch.



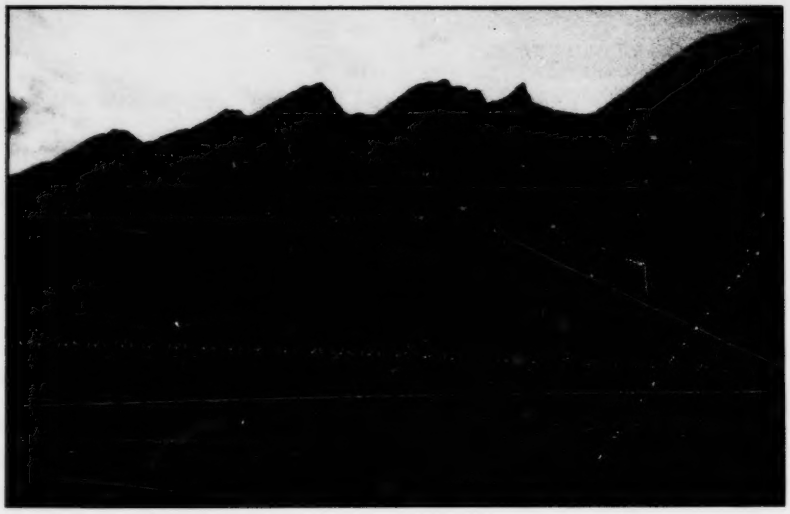
Key to diagram:

Dominant lines seen in the natural landscape

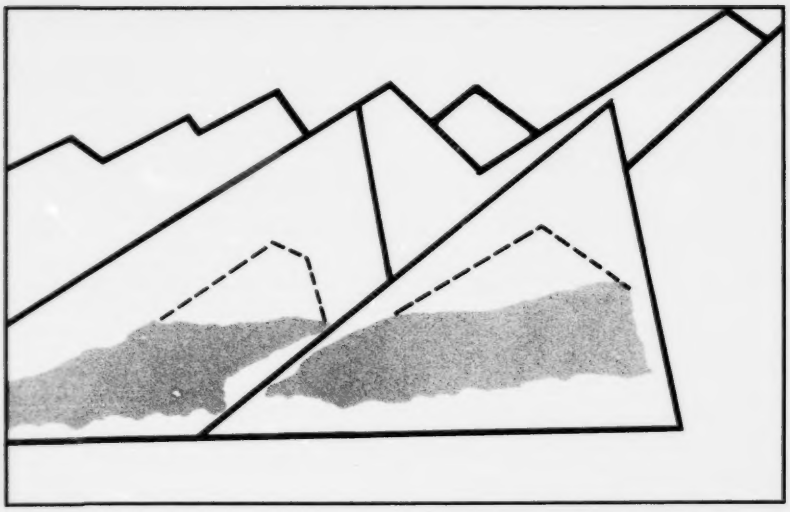
Logged area

Suggested boundary

Lussier River, Nelson Region. *The horizontal upper boundary of the logged area conflicts with the triangular pattern of the mountainous landscape.*



The sketch emphazises a series of triangles that are recognizable in the landscape and indicates suggested boundaries that would have created a better blending with these.

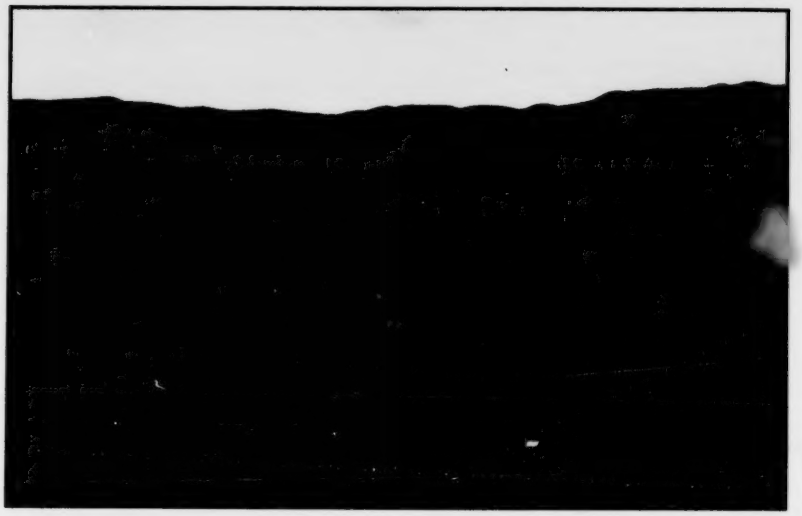


Key to diagram:
Dominant lines seen in the natural landscape.
Logged areas
Suggested boundary

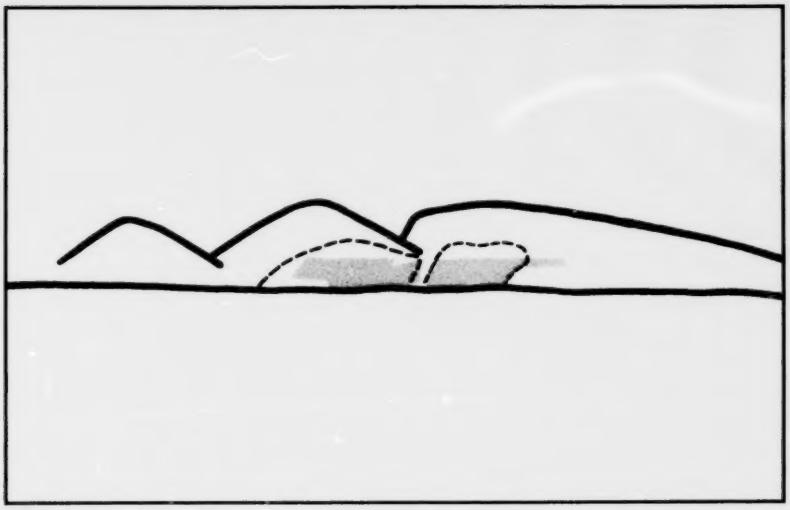
Fraser Valley, Vancouver Region. *This logged area presents a triangular shape that blends with the existing landscape and is easy on the eye.*

Clearwater, Kamloops Region.
Example of a landscape characterized by gentle undulating lines. The variation in colour and texture on the hillside is likely caused by fires and insect infestations and has resulted in a strong component of deciduous trees.

The boundaries of the logged area, as seen from two different viewpoints, follow natural forest type boundaries and the resulting shape blends well into the landscape.



Valemount, Prince George Region.
Small boundary adjustments during planning would have avoided the impact of the top horizontal lines.



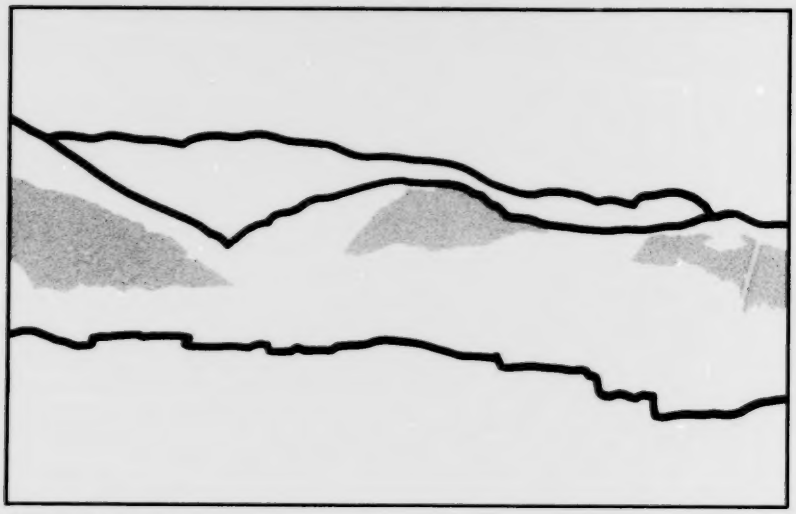
Key to diagram:

Dominant lines seen in the natural landscape ▬

Logged areas

Optional boundary - - -

Rubble Creek, Vancouver Region.
Snow causes strong contrasts but shapes blend well with dominant lines.



Key to diagram:

Dominant lines seen in the natural landscape

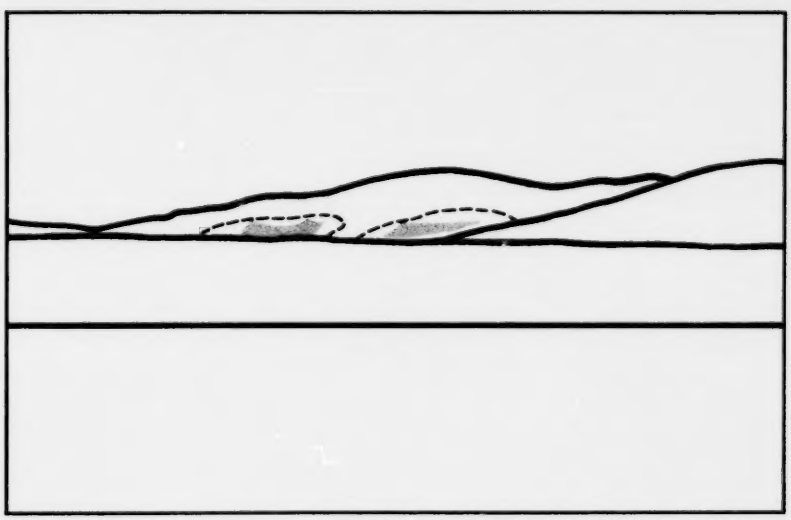
Logged areas

Sicamous, Kamloops Region

In these examples a combination of logging and leave strips has imposed unnatural and uncharacteristic shapes on the landscape. The resulting angles cause a strong visual impact.

Quesnel Lake, Cariboo Region

The sketch shows an example of how the impact could have been lessened by the elongation of the blocks and a softening of angles.



Key to diagram:

Dominant lines seen in the natural landscape ▬▬

Logged areas ▒

Suggested boundary – – –

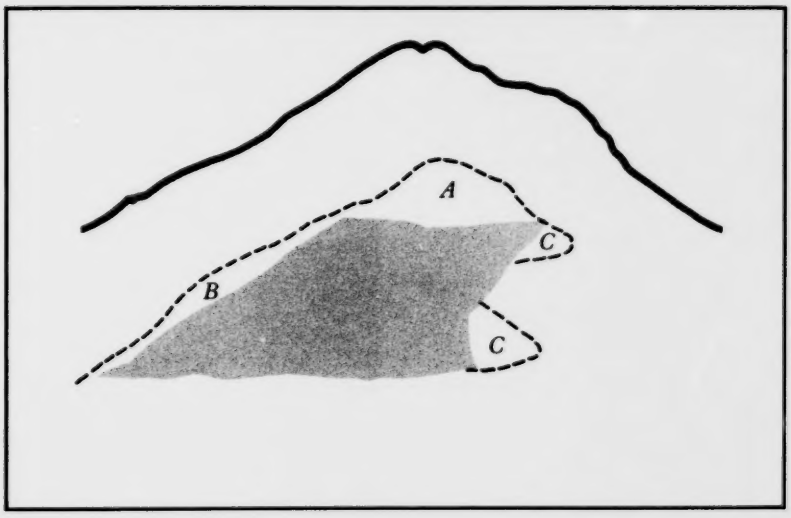
Cedar River, Prince Rupert Region. *The cutblocks in this photograph cause a particularly strong visual impact because they are located on very visible, steep slopes. Combined with distinct unnatural lines and angles, the total result is maximum modification of the landscape. Detailed landscape analysis and a different design and lay-out could have mitigated the visual impact.*

Bulkley Valley, Prince Rupert Region. *Because of gentle slopes, cutblocks appear as elongated linear impressions of low visual impact. The result indicates partial retention of the landscape.*

Kinbasket Lake, Prince George Region. *The square cutblock, seen from two viewpoints, stands out in a landscape characterized by triangular forms. Straight boundaries and resulting angles cause this distinctive appearance.*

The sketch indicates a boundary that could have included: A a triangle of loggable timber above the existing cutblock, B a strip of timber on the left, possibly up to the forest type line, C two small patches of timber on the right.

The suggested boundary in the sketch also illustrates that with good planning a more acceptable landscape and higher economic benefit could both have been obtained.



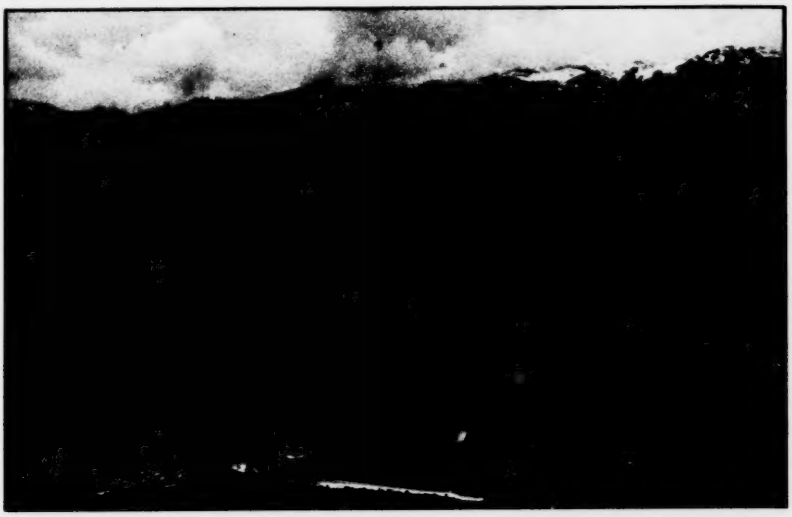
Key to diagram:

Dominant lines seen in the natural landscape ▬▬

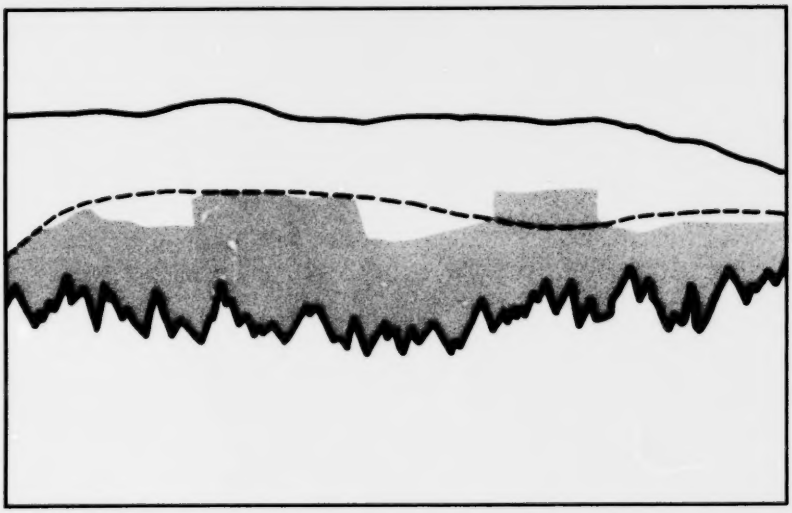
Logged area ▩

Suggested boundary – – –

Whistler, Vancouver Region. *The upper boundary constitutes a severe alteration of the landscape; also the roads cause a marked impact.*



The suggested boundary indicates the kind of impact that would blend with the landscape.



Key to diagram:

Dominant lines seen in the natural landscape

Logged area

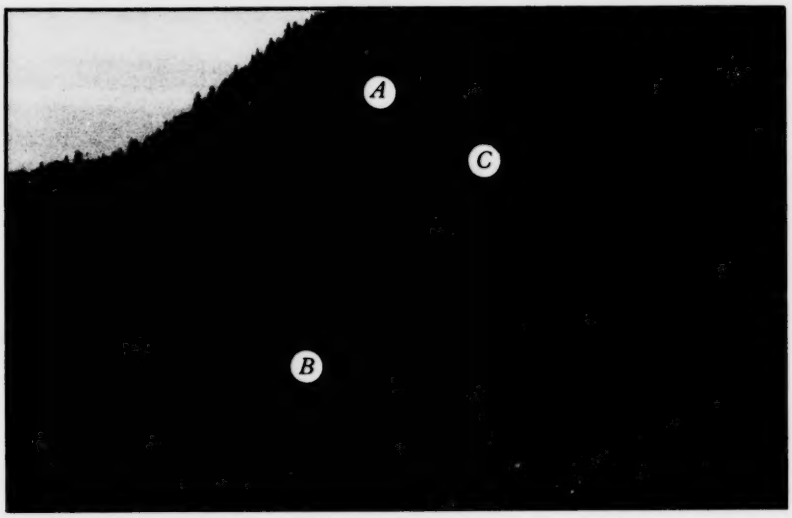
Suggested boundary

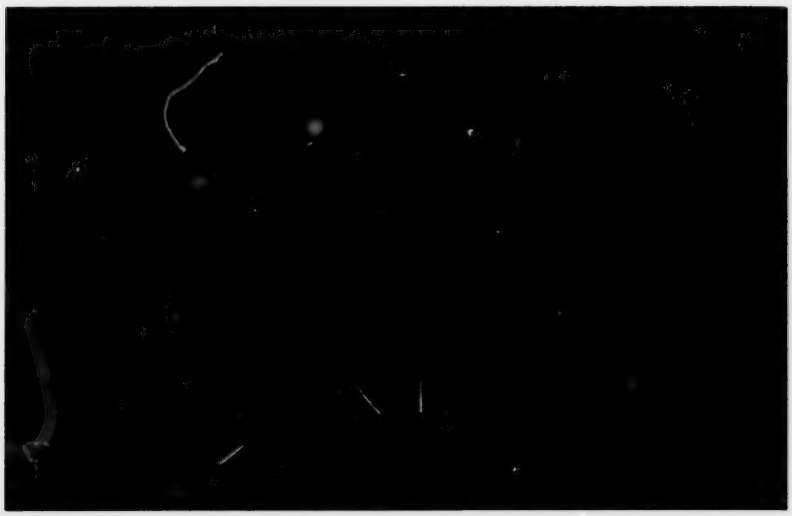
Clearwater, Kamloops Region. *An example of blending within a focal area.*

North Island Highway, Vancouver Region. *This cutblock is a typical example of a focal point. It borrows shape from the characteristic landscape.*

Detail of above photograph. *Upon closer view, the same focal area reveals distinct colours and textures of three phases in the managed forest: old growth A immature B and regeneration C*

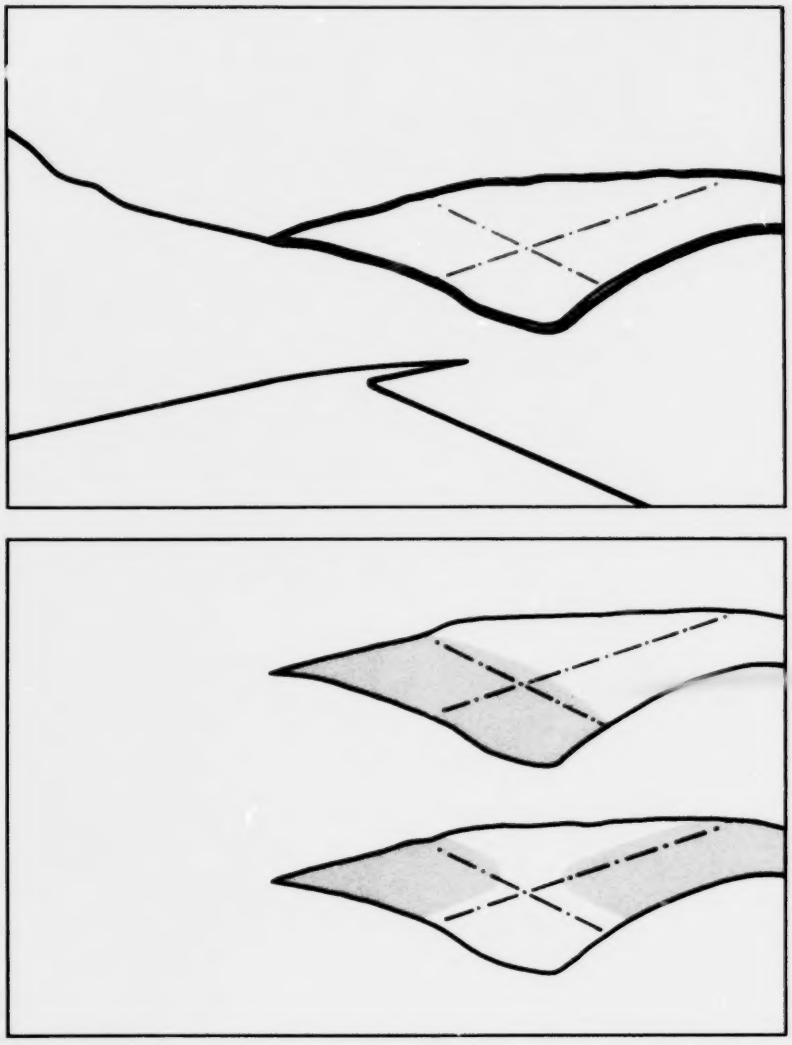
The regenerated cutblock, still showing signs of logging, will soon change to the fine textured green of the immature. In the managed forest the green-up process following logging is a most important mitigating factor in the landscape. *(See also Step 4, Logging and Silvicultural Practices, page 56).*





North Island Highway, Vancouver Region. *The background of this focal landscape is characterized by a major undisturbed forest area.*

Two of several options. *Assuming development will take place, the sketches and following procedure indicate a method of blending planned cutblock boundaries with dominant lines within the landscape, illustrated by two options.*



Procedure:

1. *Outline planning area (black in sketch).*
2. *Draw dominant lines found in landscape (green in sketch).*
3. *Draw lines (red in sketch) within the planning area paralleling the green lines.*
4. *Design cutblock boundaries more or less paralleling the red lines.*
5. *Realize that this example shows the design procedure from one viewpoint. It may have to be repeated at other viewpoints and the results blended into the best compromise design.*

Key to diagrams:

Direction of dominant lines in landscape ——

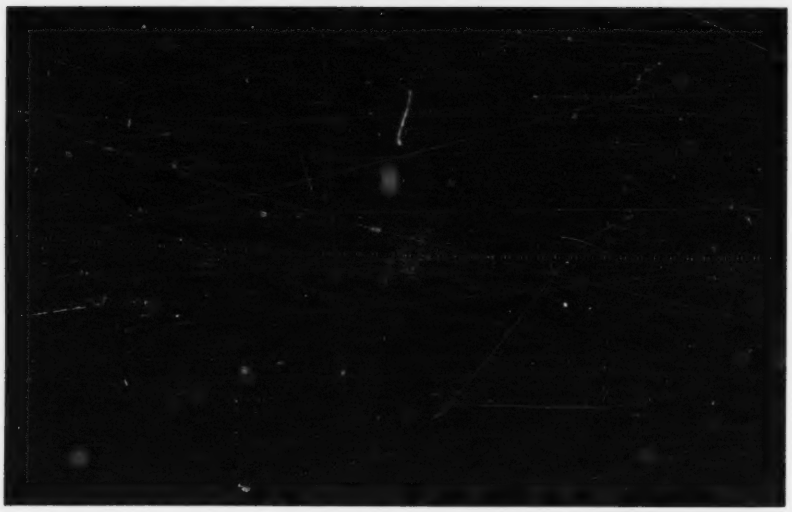
Lines paralleling the dominant lines in the landscape — · —

Planned cutblock

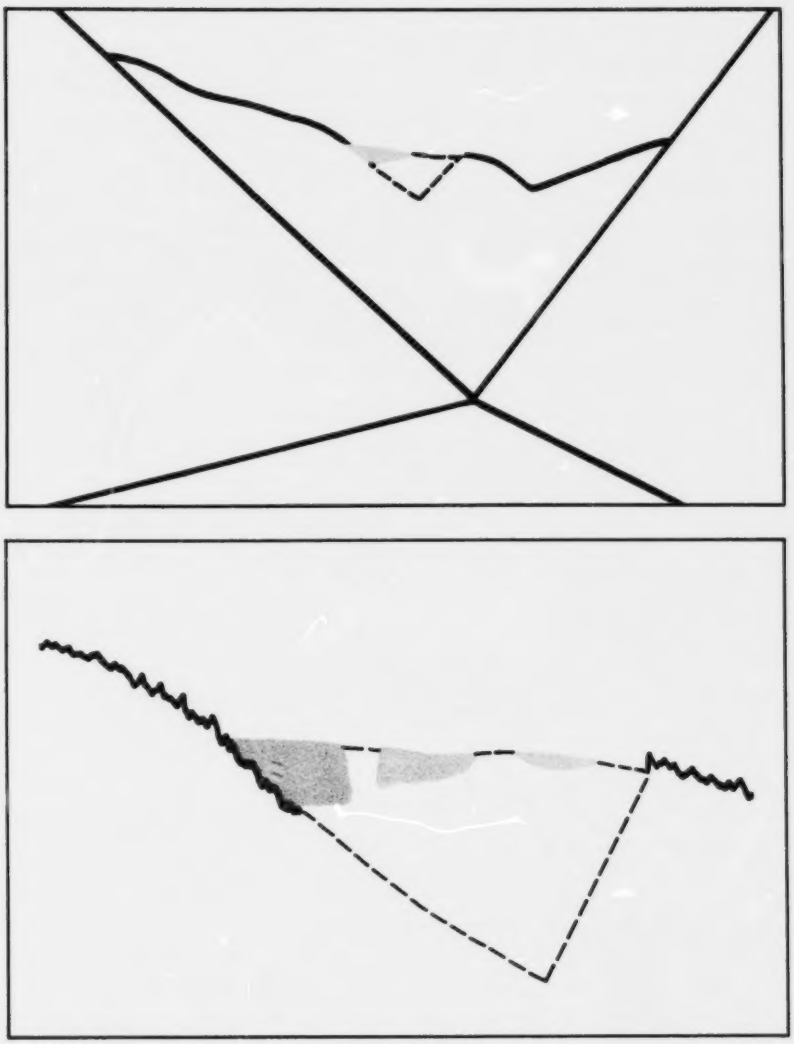
Nimpkish Lake, Vancouver Region

Logging on this focal ridge appears to be causing a minor visual impact. However, closer observation (lower picture) reveals scruffiness and blow down hazard.

Detail of above photograph

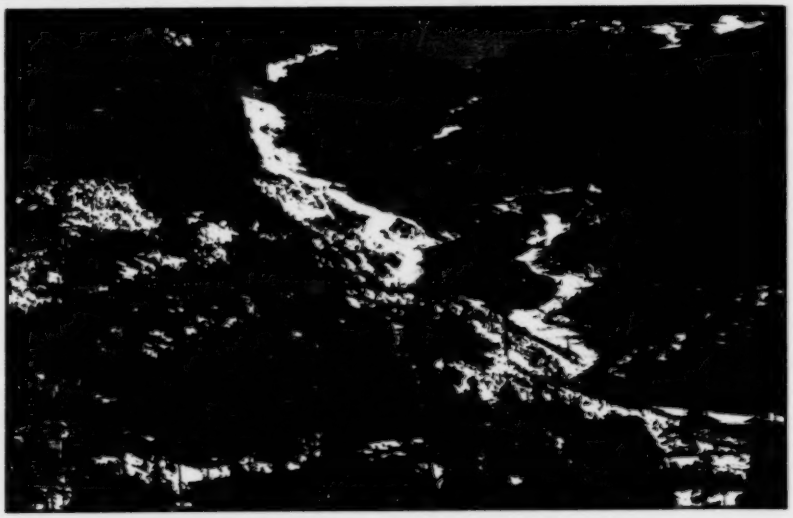


The sketches indicate a boundary that could have allowed:
1. Utilization of a small pocket of mature timber within the focal area.
2. Elimination of visible scruffiness.
3. Creation of a clean ridge line for even green-up.
4. Reduction of the blow down hazard.
5. Design of a shape to match the dominant lines of the focal landscape.



Key to diagram:
Direction of dominant lines in landscape
Logged area
Suggested cutblock boundaries

Whistler Mountain, Vancouver Region



1. *These ski runs generally blend well with natural landforms. Immature trees (15 to 20 years old) are already contributing to ongoing reduction of the impact on the landscape.*

Present impact is rated as, medium to low.

Blackcomb Mountain, Vancouver Region

2. *The new ski runs are very evident as are the existing cutblocks. Further development and green-up of ski runs and cutblocks will progressively reduce the strong contrasts in this landscape.*

Present impact is rated as, medium to severe.

Highway 26, Cariboo Region

3. *This ski development has resulted in strong contrasts caused by line and angle (top left), by clearing size and by colour changes on the sk On the right side of the ski hill, the vegetation pattern has a blending effect. Relocation and feathering of the boundary and revegetation of exposed areas on the slope would greatly improve this landscape.*

Present overall impact is rated as, severe.

Ski developments occur in many areas of the province, often on visually sensitive forested slopes and in the proximity of active logging operations. Integrated resource situations of this type require a particularly high standard of landscape management for both the ski development and adjacent logging areas.

Much of the skier's enjoyment relates to the total environment of the ski area in the winter. The design of ski runs and cutblocks is important because snow emphasizes line and shape and causes strong visual contrasts.

Step 4
Logging and Silvicultural Practices

Following Step 3, Design and Lay-out, the manager must consider a most important aspect of landscape management: Logging and Silvicultural Practices. It should be realized that various kinds of people will perceive the visual impact of logging and silviculture differently. (See Part I – Visual Impacts and Perceptions).

Well planned forest development with a high standard of road construction and logging can be a positive influence on the landscape. Where there are low levels of planning and ill-considered logging operations, a whole range of negative side effects becomes visible. These can cause severe public criticism.

Examples of Logging Practices that can be a positive influence on the landscape are:

Roads

- locating logging roads, with consideration for scenic values, on stable ground and in situations where cuts and fills can be minimized; use of appropriate blasting techniques,
- removing excessive road building material, particularly in light coloured rock and soils (end-hauling may be a suitable solution), designing adequate drainage standards (ditches, bridges and culverts) and providing proper maintenance of these,
- practising good "housekeeping" by removing debris along roadsides and by rehabilitating exposed soil and rock cuts, i.e. hydro seeding and/or other techniques.

See also the U.S. Forest Service Publication: National Forest Landscape Management Volume 2, Chapter 4, (Roads). Agriculture Handbook, Number 483.

Logging

- reducing the influence of skid trails by use of alternate or other applicable logging methods,
- removing damaged or poor quality residual trees and those damaged during slash burning,
- reducing the incidence of high stumps and other evidence of poor utilization,
- using long yarding type logging techniques (cable or aerial) to minimize the extent of road construction, *particularly* in steep terrain,
- requiring good "housekeeping," e.g. immediate clean-up of landings and logging equipment debris,
- rehabilitation of landings, skid trails and abandoned roads if necessary.

Silviculture

Examples of Silvicultural Practices that can be *a positive influence* on the landscape are:

- choosing the most appropriate silvicultural system, e.g. selection, shelterwood cutting or clear cutting with natural or artificial regeneration,
- inducing early natural and/or artificial regeneration,
- scarification (breakdown of slash and rapid green-up).
- practicing forestry on a sound ecological basis, resulting in early and successful green-up.

Green-up is a most important positive influence on the managed forest landscape. It is the process of re-establishing vegetation after logging. Initially, logging debris and disturbed soil generate a strong colour contrast with the surrounding forest. This is followed by a greying of exposed woody material and the appearance of green herbaceous vegetation.

In following years increased growth of the vegetation and simultaneous regeneration of deciduous and coniferous trees continue the green-up process. Initially green-up is most noticeable during the summer and fall and totally invisible during snow cover. Later, when the growth rate of trees accelerates, green-up becomes more visible at all seasons and the process is completed when immature forests provide full ground cover. The rate and degree of green-up is endlessly variable and closely related to time. Also, when cutblocks are seen from a low viewing angle, the green-up process appears to be more advanced.

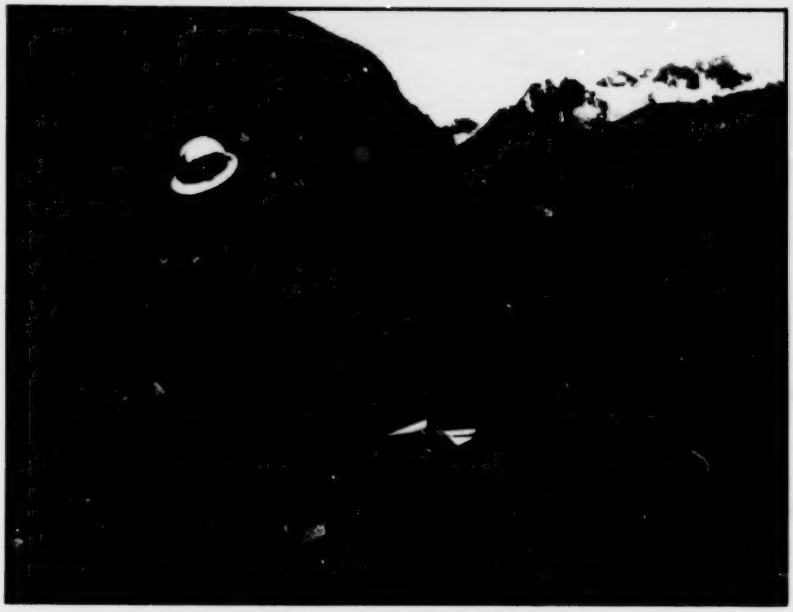
Factors to consider in evaluating the early green-up are:

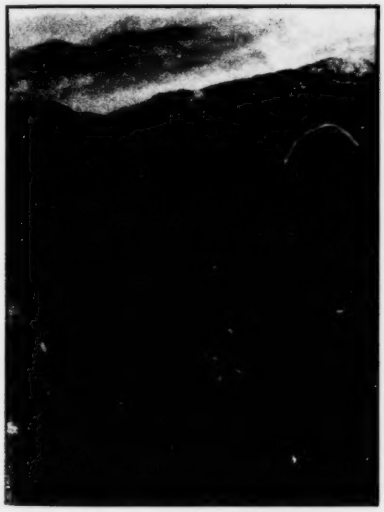
- moisture content and soil fertility
- elevation
- latitude
- aspect
- rainfall
- temperature

Green-up in the forest environment is pleasing to the eye; it is a vital component in forest landscape management.

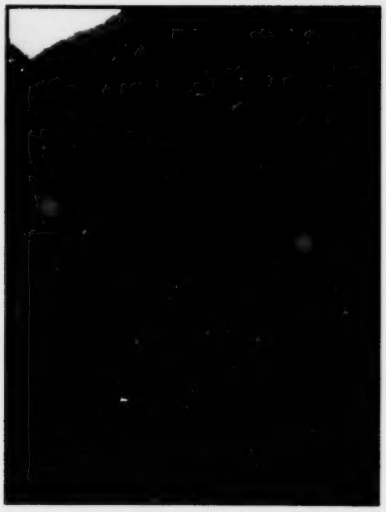
The following illustrations show, and the comments explain, examples of positive as well as negative influences on the B.C. forest landscape resulting from Logging and Silvicultural Practices.

Gold River, Vancouver Region

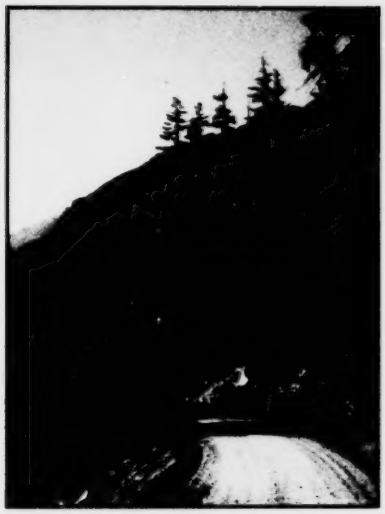




Mokst Lake, Vancouver Region



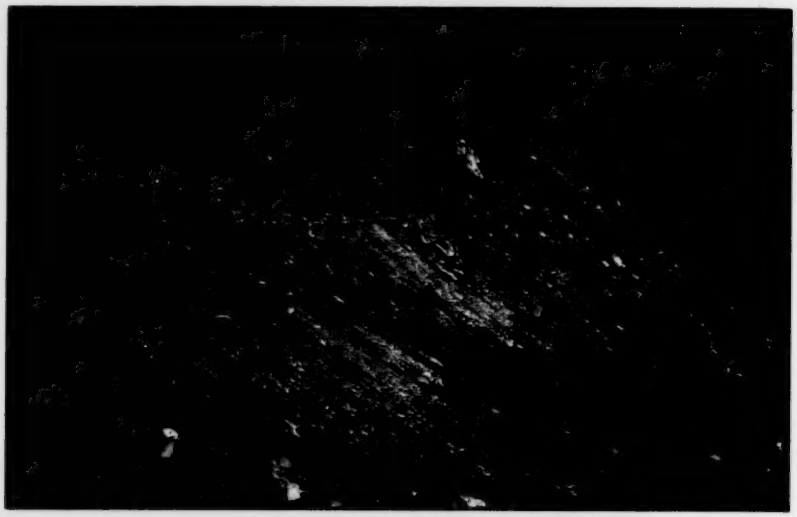
Humamilt Lake, Kamloops Region



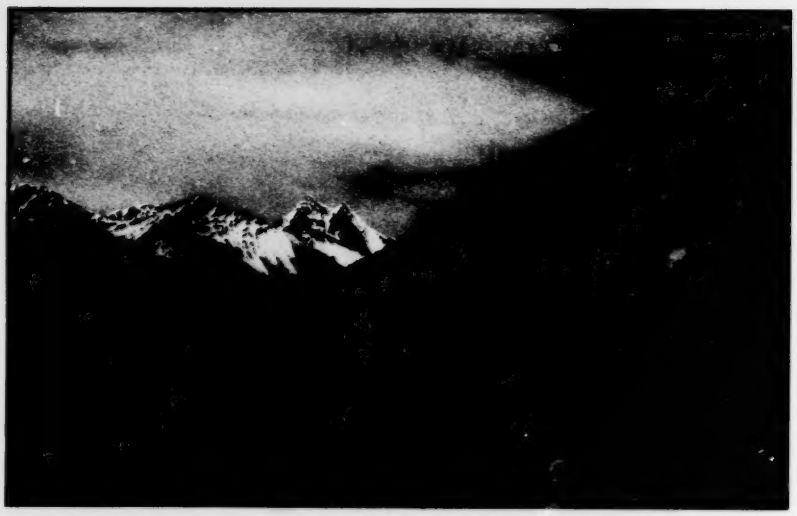
Chilliwack, Vancouver Region

The above photographs show positive aspects of road layout and construction.

Nakusp, Nelson Region. *Very serious negative side effect of road building.*

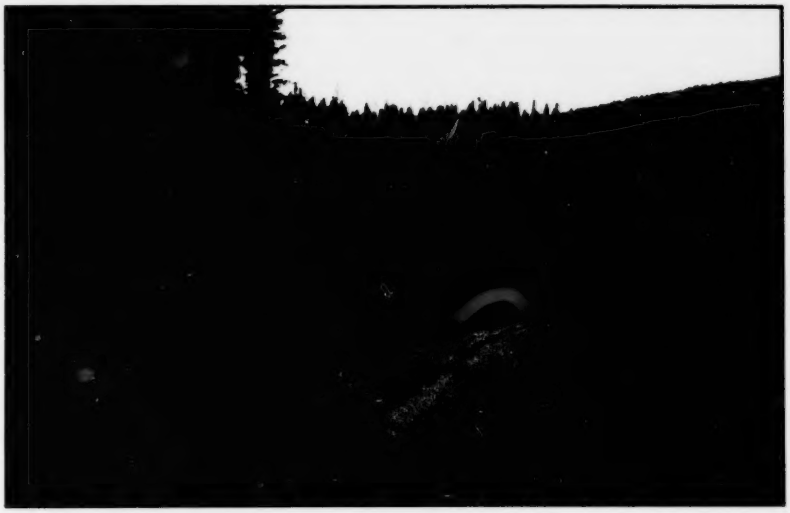


Kinbasket Lake, Prince George Region. *Helicopter logging can eliminate road scars in steep terrain.*



Lillooet, Kamloops Region. *A well-designed and constructed logging road which has a low negative side effect on the viewer.*

Cariboo Region. *Hydro seeding can mitigate visual impacts along roads.*



Harrison, Vancouver Region. *Road failures have caused severe visible impact as well as loss of productive forest land.*

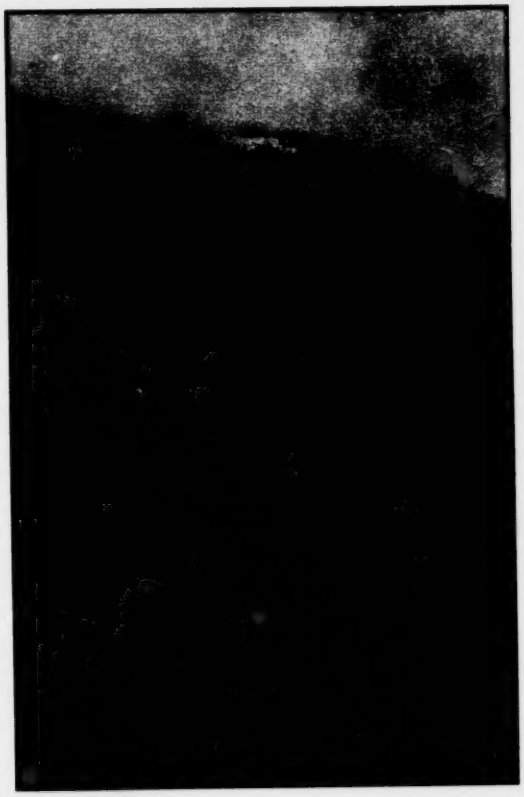
Vancouver Region

Highway 16 East,
Prince George Region

High stumps and damaged residual trees left standing give the impression of low utilization and little concern for clean-up. In areas such as these where the foreground has a dominant impact on the observer, special care should be exercised in the selection of logging methods, location of landings and clean-up.

Whistler, Vancouver Region. *Complete forest utilization requires the yarding of all merchantable trees, particularly along setting boundaries. This photograph indicates little waste of merchantable wood and a blending of the logged area with the adjacent immature and rock outcrops.*

Squamish, Vancouver Region. *Slash burning is intended to reduce the fire hazard and to prepare a site for reforestation. However, fire escapes along the fringes often kill trees which, when not salvaged, are wasted and cause long term visible scars in the landscape.*



Whistler, Vancouver Region. *The isolated snags and trees leeve an impression of incomplete logging and invite criticism of logging practices.*

Nazko, Cariboo Region. *Logging practices appear orderly for a clear-cutting operation.*

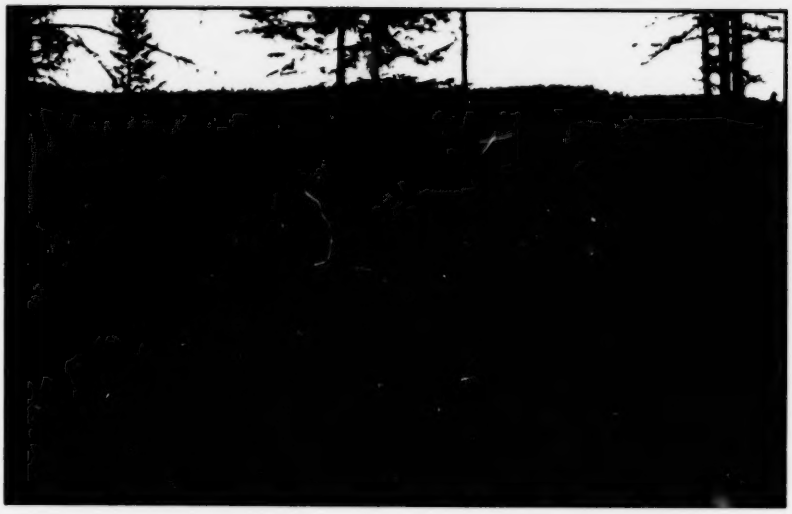
Nazko, Cariboo Region. *Generally speaking, poor quality residual trees are detrimental to a forest landscape. This picture illustrates how healthy residual trees can mitigate the impact of logging.*

Silvicultural Systems

Selective logging, in suitable forest ecosystems, causes a low visual impact on landscapes.

Golden, Nelson Region

Kettle Valley, Nelson Region



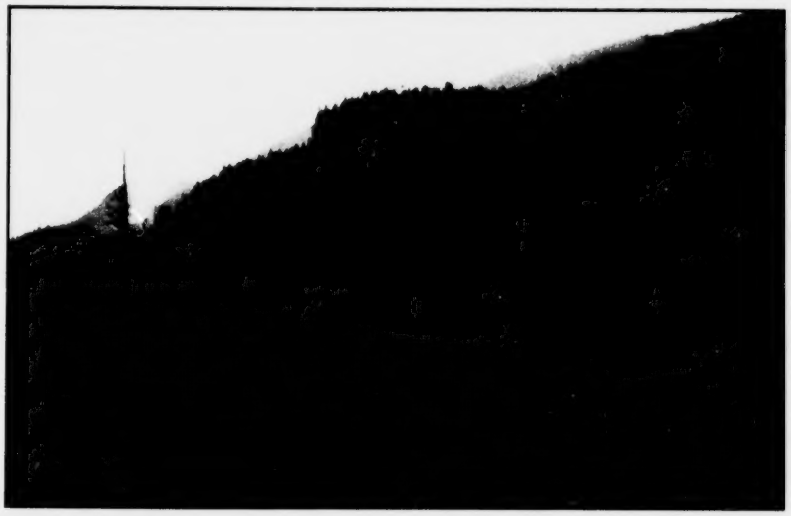
Regeneration

Slashburning, planting and natural regeneration are all phases in the green-up process, (for description see page 56).

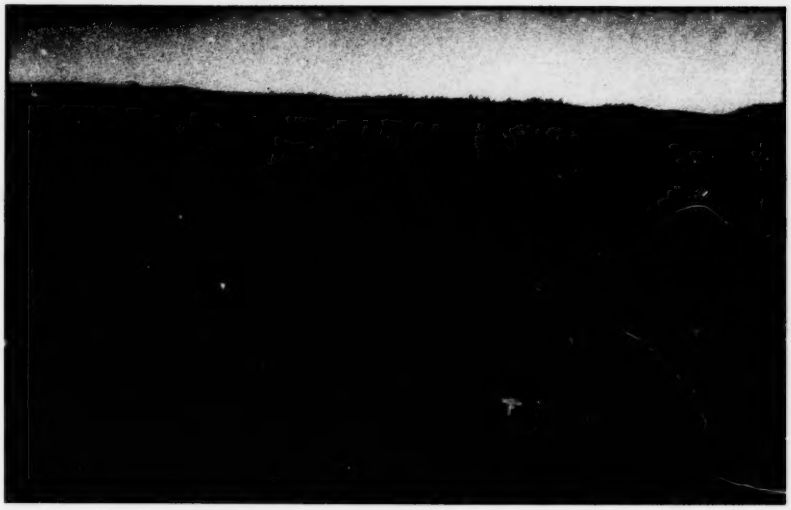
North Island Highway, Vancouver Region. *recently logged.*

Chapman Lake, Prince Rupert Region. *Plantation, approximate age 10 years.*

North Island Highway. Vancouver Region. *Natural regeneration, 10–15 years old.*



Skidegate Lake, Prince Rupert Region. *Naturally regenerated following slash fire; immature forest about 20 years old.*



Step 5
Follow-up

The last step in the landscape management process involves ascertaining whether the implementation of the design achieved the desired results. It is important that this assessment be relatively brief. The purpose can be twofold: firstly, to learn from successes and failures and secondly, to ensure that landscape management activities have been conducted in an efficient, economical and effective manner.

The manager should ask the following questions.

1. Was the Landscape Inventory adequate?

2. Did the Detailed Landscape Analysis contribute to the best landscape management decision?

3. Did the design meet the Visual Quality Objective?

4. Did the standard of Logging Practices result in an acceptable impact on the landscape?

5. Were there special situations that should be recorded and communicated to others to aid them in improving their landscape management techniques?

Appendix

Appendix 1 Identification of Viewpoints and Visible Area Plotting Techniques.

Viewpoints are specific existing or potential locations which offer either brief or sustained opportunities for the viewing of vistas and/or landscapes of special interest. Some of the more obvious kinds of viewpoints are:

- roadside rest areas and points of interest, both formal and informal
- campsites, recreation sites and points of interest such as historic or archeological sites
- ski areas, both downhill and cross-country
- extensively used trails, both in valley bottom and high elevations
- highways, railroads and other avenues which allow sustained viewing
- residential areas
- lakeshores and similar areas of public congregation

Selection of viewpoints is made after:

- references to maps, records and other sources of information
- visits to the area
- talking to people in and about the area under study

Records should be retained of all data, information and opinion gathered. A photo record of views and viewpoints would be of particular value during the design stage of landscape management (Step 3).

Visible Area Plotting determines the geographic limits of the area seen from a viewpoint or viewpoints and is a translation of the observed visual boundary into a line on a map. The plotting may be accomplished using one or a combination of techniques:

1. Direct Field Plotting:

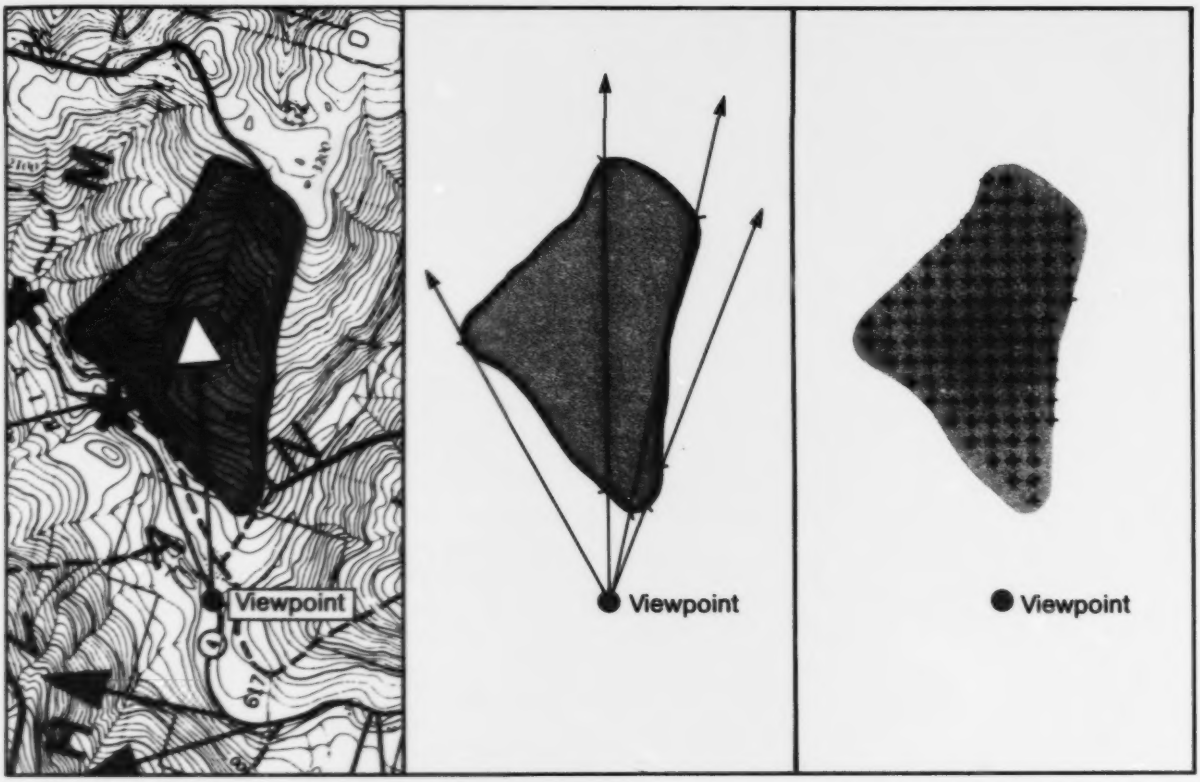
At the viewpoint, the visible area is outlined directly onto a topographic map or air photo. Plotting can also be accomplished using photographs taken from viewpoints. For further information see also Appendix 3, Design Plotting Techniques.

2. Hand Drawn Section:

This is a hand method which produces essentially the same results of computerized plotting. This hand method is time consuming and requires some drafting expertise. However, it can be readily applied to small scale projects or used when computer programming is not available. The accuracy of both computer plotting and hand drawn sections is directly related to the contour interval. For further information see also Appendix 3, Design Plotting Techniques.

3. Computer Plotting:

This is a process of digitizing a map and selected viewpoints into a preprogrammed computer which synthesizes the information and projects the seen area as horizontal projections. The system is accurate but the relatively high cost must be considered. For further information see Appendix 5, The Use of Computers.

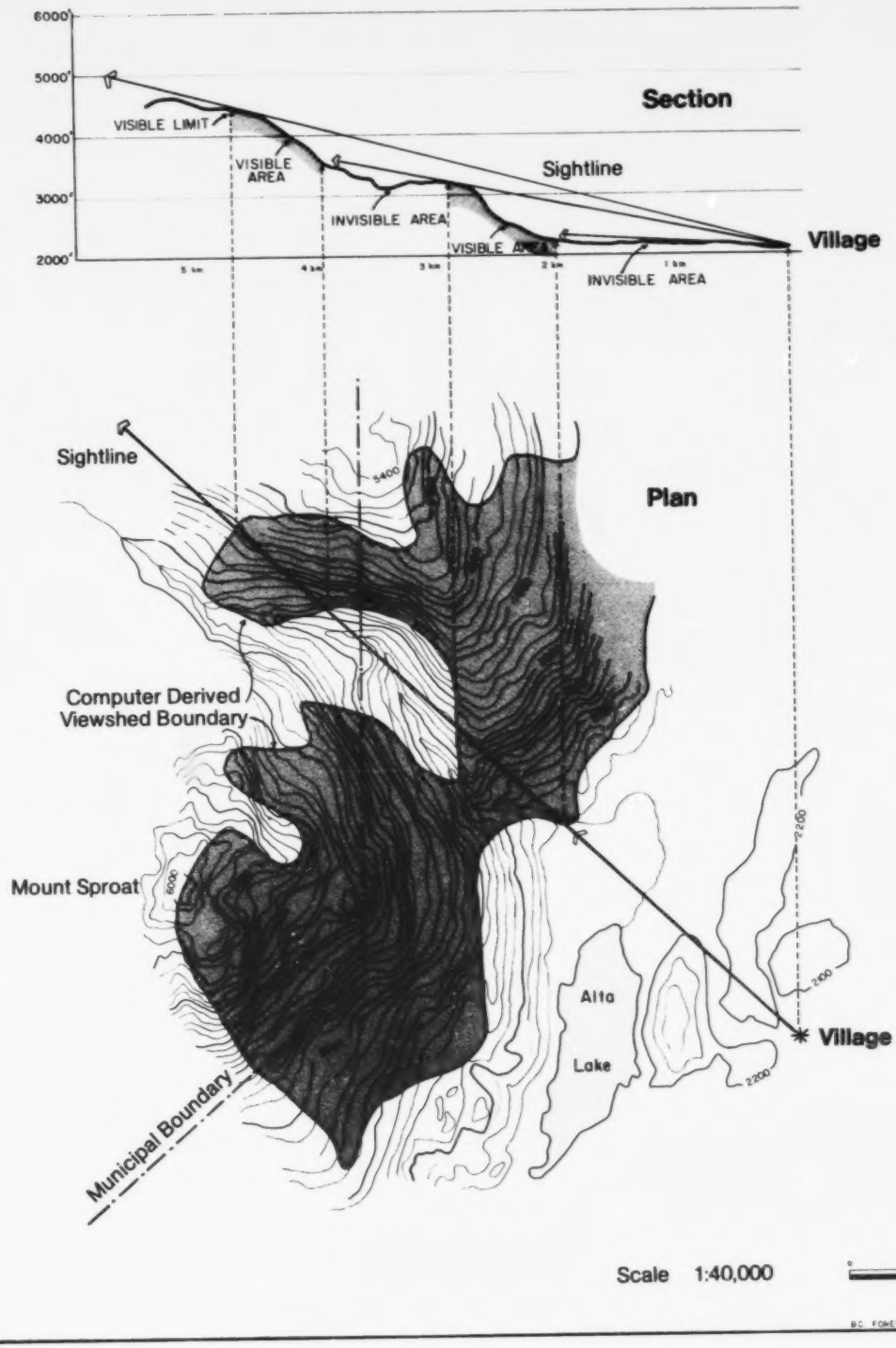


1. Direct Field Plot 2. Hand Drawn Section 3. Computer Plot

Each method has advantages and disadvantages. The most successful landscape analyses conducted in British Columbia have used a combination of all three methods. It is essential that visual area boundaries be confirmed by field visits to viewpoints.

Map 3 shows an example of Computer Plotting and a Hand Drawn Section.

Map 3 Plotting The Visible Area-Whistler Village



Appendix 2
Visual Quality Objectives (VQO's)

A Visual Quality Objective, or VQO, defines a level of acceptable landscape alteration. A VQO can be assigned through a senior level of planning or selected by the manager. It should reflect the social and economic needs of the province and the perceptions of people. (See Part 1–Visual Impacts, Perceptions).

Five Visual Quality Objectives will be recognized.

- Preservation
- Retention
- Partial Retention
- Modification
- Maximum Modification

The illustrations that follow show examples of Visual Quality Objectives as they might apply to selected British Columbia landscapes. The accompanying explanations are based on the detailed versions contained in the U.S. Forest Service publication, National Forest Landscape Management, Volume 2, Chapter 1, The Visual Management System, Agriculture Handbook, Number 462.

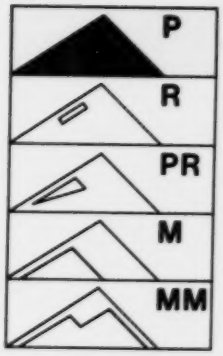
Preservation

The Preservation VQO allows activities, such as maintenance of minimal facilities (recreation sites, trails), that enhance natural wildland values. Alterations beyond this, such as logging, are not acceptable.

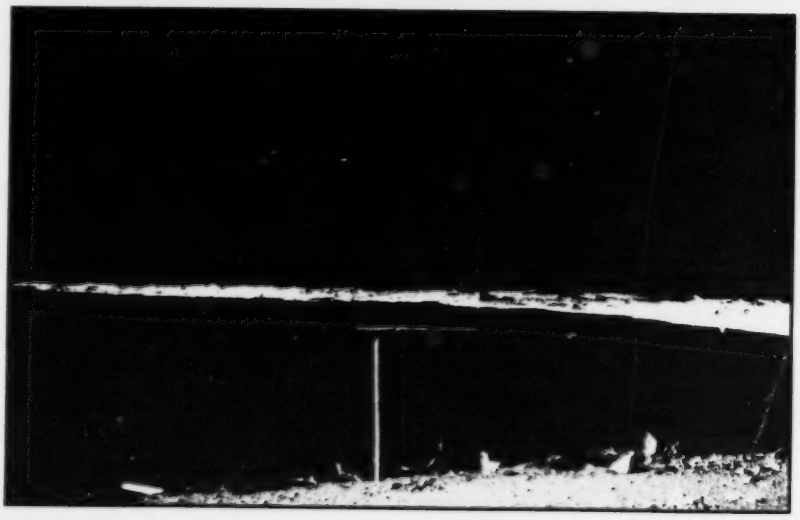
In the managed forest, preservation may apply to relatively small areas where landscape values are high and outweigh other natural resource values, e.g. some land/water interfaces, special features of visual, historical, geological, biological or educational importance, areas of value for recreation.

These illustrations show important land/water interfaces.

Kerry Lake, Prince George Region



Duffey Lake, Kamloops Region

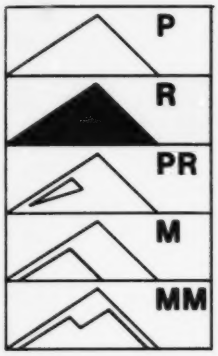


Retention

The Retention VQO requires that management activities or alterations not be visually apparent. The goal is to *repeat* the line, form, colour and texture of the characteristic landscape.

In the managed forest, retention may apply to areas where landscape values are high and where changes may be discernible but not clearly visible, e.g. land/water interfaces, vistas, views and focal areas.

Kennedy Lake, Vancouver Region. *Logging on the ridge, or saddle, is not evident to the casual viewer.*



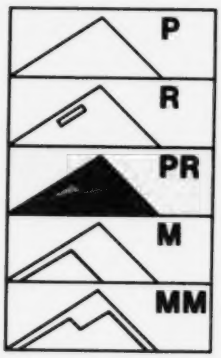
Princess Louisa Inlet, Vancouver Region. *The small logged opening at the top left could be an element in the natural landscape as it repeats several of the natural characteristics.*

Partial Retention

The Partial Retention VQO requires that alterations remain visually subordinate to the characteristic landscape. Repetition of the line, form, colour and texture is important to ensure a blending with the dominant elements.

In the managed forest partial retention may apply to areas where landscapes are of aesthetic importance and where management activities generally can match the landscape character and do not cause an obvious intrusion, e.g. where landscapes can absorb change See also Appendix 4.

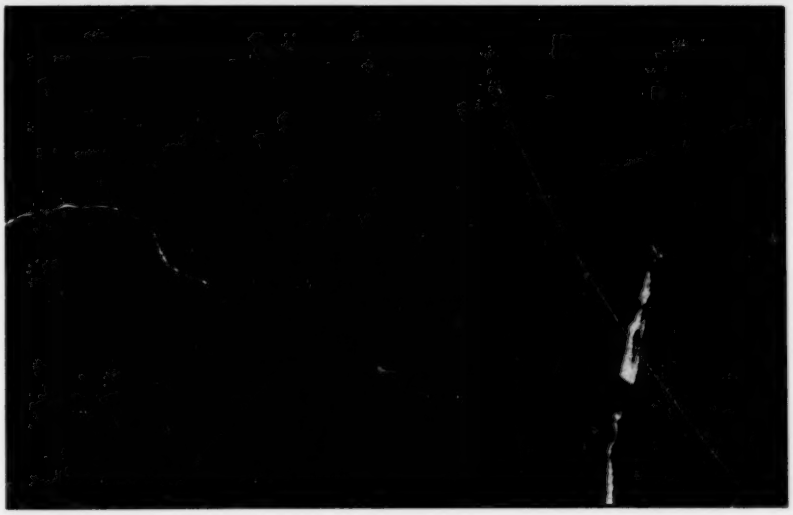
Sicamous, Kamloops Region



Mara Lake, Kamloops Region

Logging activities in these two illustrations are being absorbed by the landscape since they repeat much of its form, line, colour and texture.

Toba Inlet, Vancouver Region. *This example of recent helicopter logging demonstrates a blending of line and form; weathering of the slash and ready green-up will soon meet the Partial Retention VQO.*

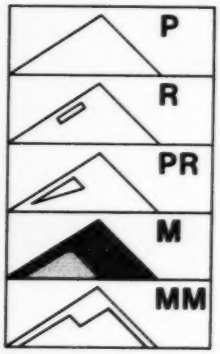


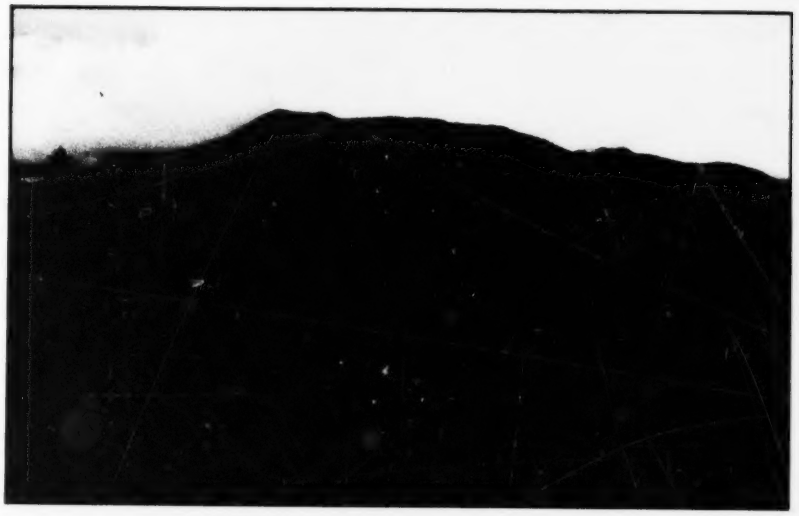
Modification

The Modification VQO allows alterations to dominate the original characteristic landscape. However, alterations must borrow from natural line and form to such an extent and on such a scale that they are comparable to natural occurrences.

In the managed forest modification may apply to areas where landscapes are more common and where management activities can blend with existing dominant lines, shapes and forms; it applies in particular to first-pass forest development.

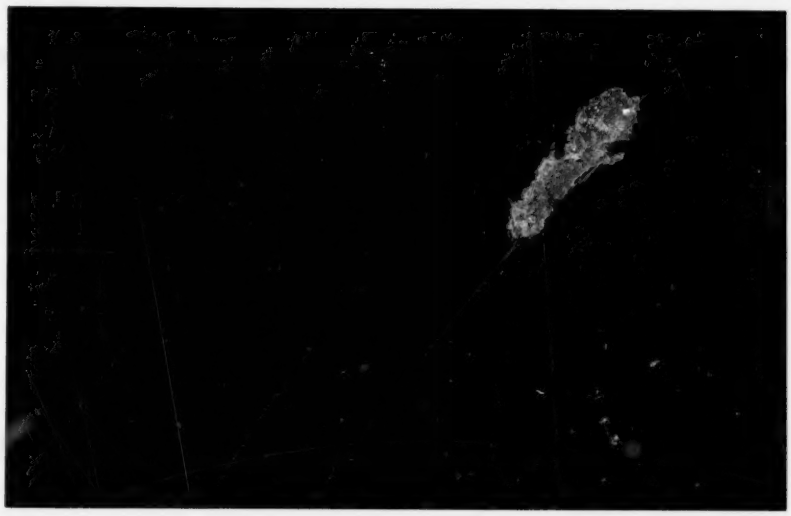
Nass Valley, Prince Rupert Region





Sproat Lake, Vancouver Region

Nimpkish Lake, Vancouver Region

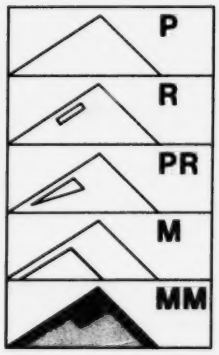


Maximum Modification

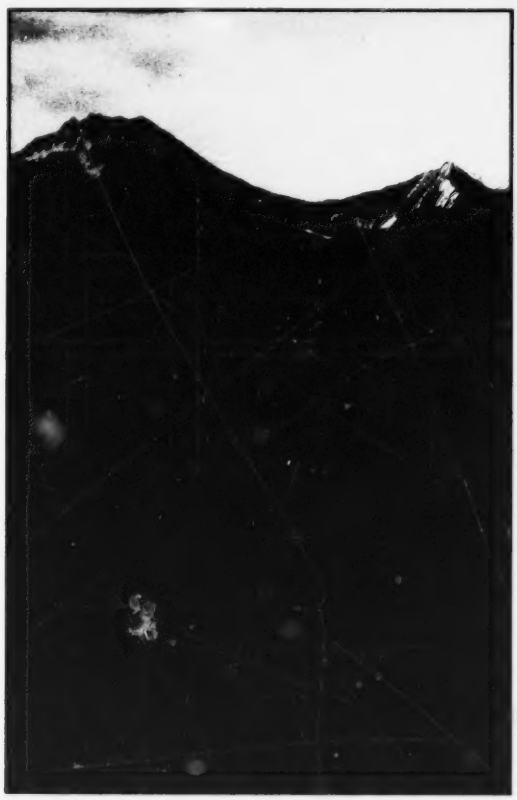
The Maximum Modification VQO permits a dominant change to the original landscape, particularly in the foreground and middle-ground. Alterations may be out of scale or show detail quite different from natural occurrences.

In the managed forest maximum modification may apply to areas where landscapes are common and where resource use activities dominate the landscape; at close range changes to the landscape may be out of scale, but from a distance changes should appear to be natural occurrences; this VQO also applies in particular to natural disaster areas, e.g. fires, insect infestations, windthrow.

Vancouver Region



Nelson Region



Golden, Nelson Region

Appendix 3
Design Plotting Techniques

The techniques used for design plotting are comparable to those used for Visible Area Plotting as described briefly in Appendix 1.

1. Field Plotting of Designs:

At the viewpoint, the designer chooses a design compatible with the landforms, timber types and landscape features, then transfers the shape directly onto a field map, using airphotos, topographic maps and drawings as aids and references. In many instances the lay-out is in plan form and verification of its perspective view is important. Photography and drawings derived from slide projections can be important aids in designing and showing planned cutting patterns. Also, stereo viewing of photos may assist in plotting.

2. Hand Drawn Projections:

An example of a hand drawn projection is that developed by the U.S. Forest Service and called Orthographic Projection.* (R. Hughes developed from this a Radial Line Plotting technique to estimate the visual impact of logging on the forest landscape, Kamloops Region 1978).

Orthographic Projection

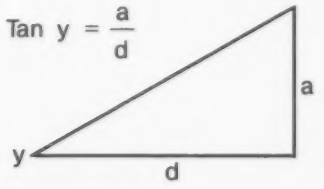
To visualize how the plan view of a proposed harvest area will appear from various viewpoints, the following orthographic projection technique may be employed.

1. Plot major line of sight from selected viewpoint through proposed harvest area on topographic map. Note orientation of harvest area to plotted line of sight. (Fig. 1)

2. Find view angle. This may be accomplished in two ways: (Fig. 2)

(a) Draw topographic profile along plotted line of sight from viewpoint through proposed harvest area. Using the viewpoint as the angle point, measure view angle with protractor. Maintain similar horizontal and vertical scale.

(b) Using topographic map, determine difference in elevation between viewpoint and center of proposed harvest area and horizontal distance from viewpoint to center of proposed harvest area. Determine tangent of view angle (y) by dividing elevation difference (a) by horizontal distance (d).



Utilizing table of trigonometric functions, determine viewing angle.

3. Determine average slope angle of proposed harvest area by approximating drawn profile or trigonometric means.

*Forest Landscape Management, Volume One, U.S.D.A. Forest Service Northern Region, 1972 – pages 92 – 94.

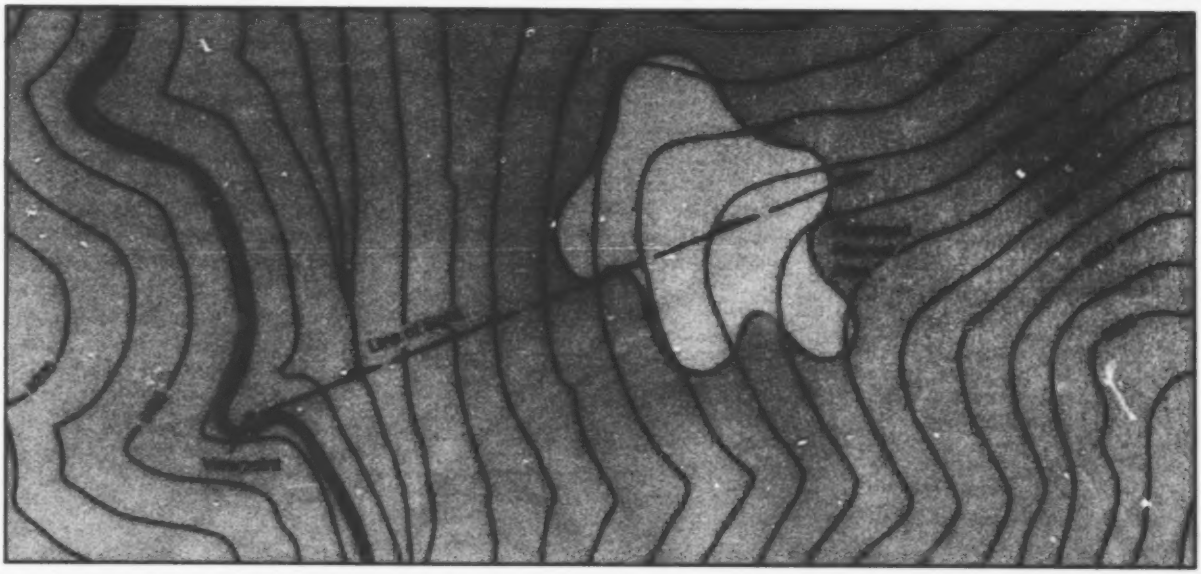


Fig. 1. *Partial of map showing plotted line of sight, viewpoint location, and proposed harvest area.*

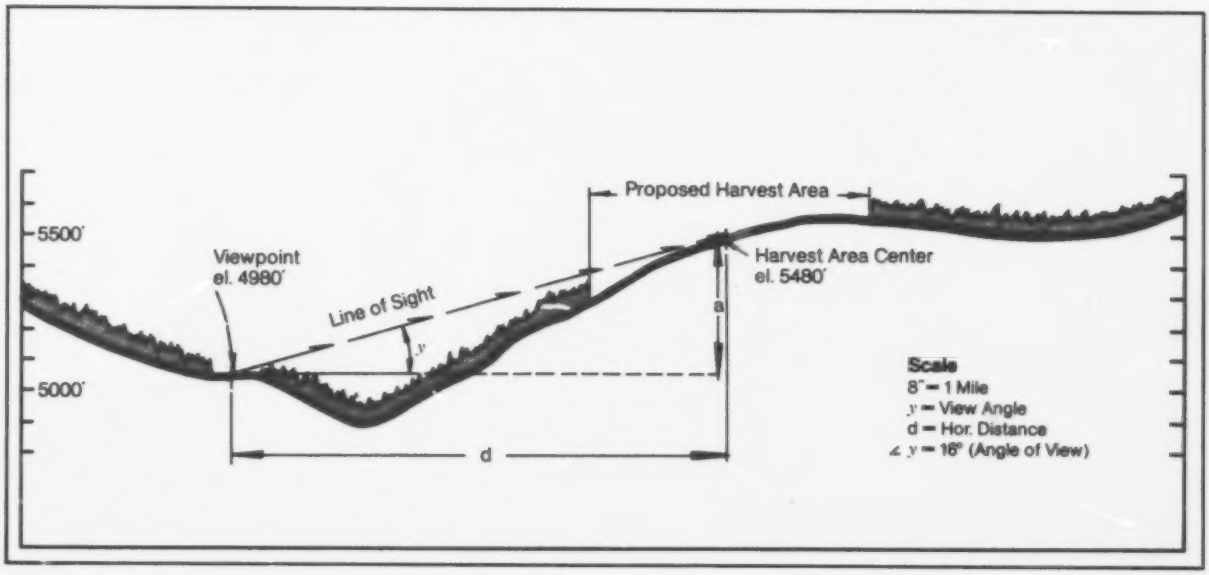


Fig. 2. *Typical topographic profile. (Corresponds to Fig. 1).*

4. As shown in Fig. 3 draw harvest area plan view. Orient to position that will make plotted line of sight vertical.

5. Project perpendicular, horizontal, and vertical lines from harvest area extremes.

6. Draw 45° projection line through horizontal lines. Drop verticals from line intersections.

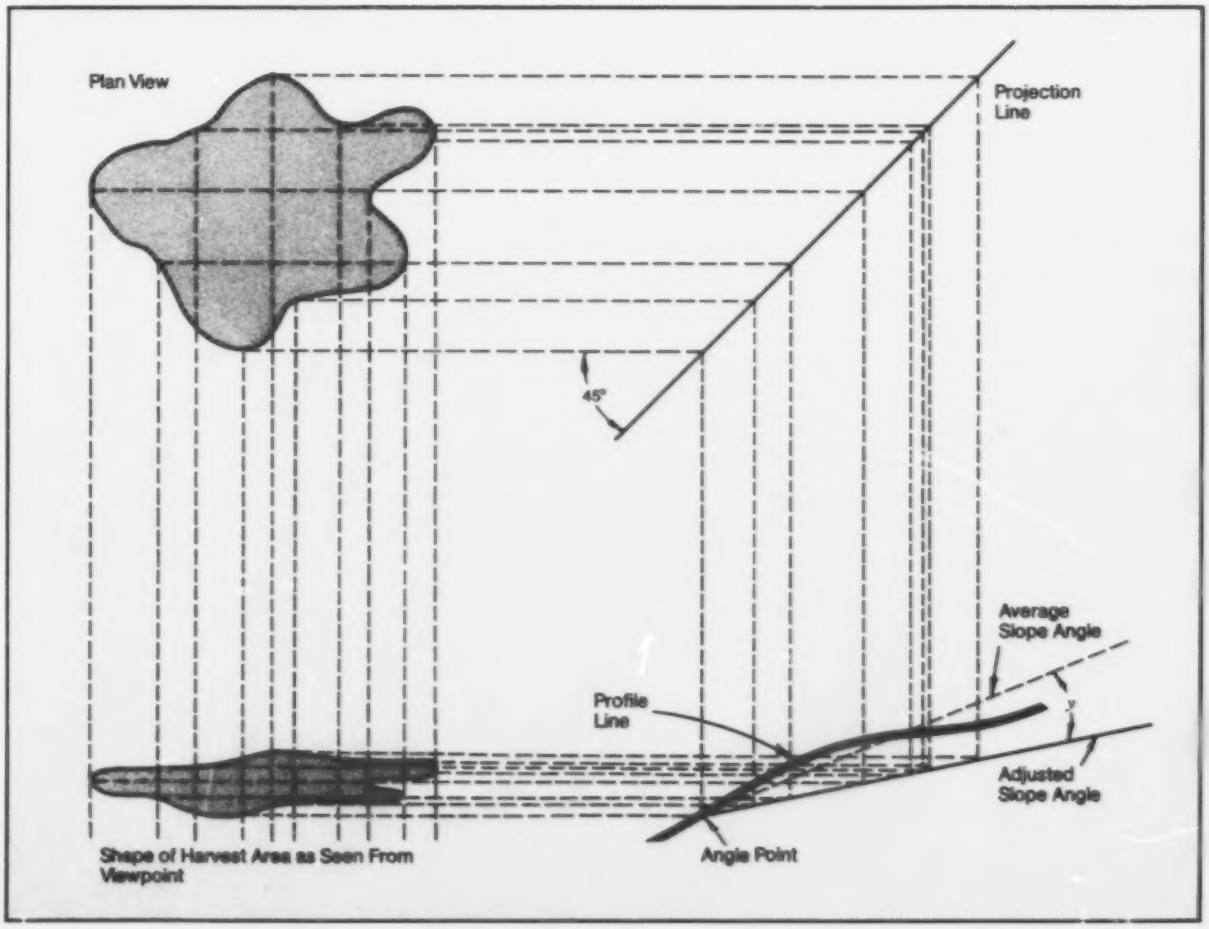
7. Choosing convenient angle point along extreme left vertical line, plot adjusted slope angle. If viewpoint is above harvest area center, swing angle y above average slope angle. If viewpoint is below harvest area center, swing angle y below average slope angle. (Angle adjustments prevent skewing and distortion of projected harvest area shape.)

8. At intersections of vertical lines and adjusted slope angles, project horizontal lines until they intersect their respective verticals from the plan view. Connect intersection points to obtain shape of harvest areas as seen from viewpoint.

Note:

Orthographic projection does not account for perspective influences. Difficulties in projecting plan views from irregular surfaces (concavities and convexities) also exist. It is faster to use than perspective techniques which require the accurate positioning of viewpoints in relation to harvest area profiles, however.

Fig. 3. *Typical orthographic projection.*



3. Computer Plotting

A number of systems have been developed; some of the major ones are: Mosaic, Viewit, and Preview. (For further information see Appendix 5, The Use of Computers).

Another system, and one with specific practical potential in determining cutblock shapes, is Perspective Plot*. This system requires a topographic map, desk-top computer, digitizer, and plotter. The procedure creates accurate perspective illustrations (plots) of cutting unit boundary lines and other key topographic features. Its simplicity and speed make it ideal for direct operation by the landscape designer. This permits immediate interaction between the designer and the plot, with rapid "back and forth" convergence towards the best design. In addition, this technique provides information which can facilitate the field location and marking of unit boundaries. The information should be useful to those land managers concerned with both the marketable and non-marketable values of their resource, and more specifically to landscape architects and logging engineers teamed for the purpose of planning timber harvests that meet visual objectives.

Perspective Plot

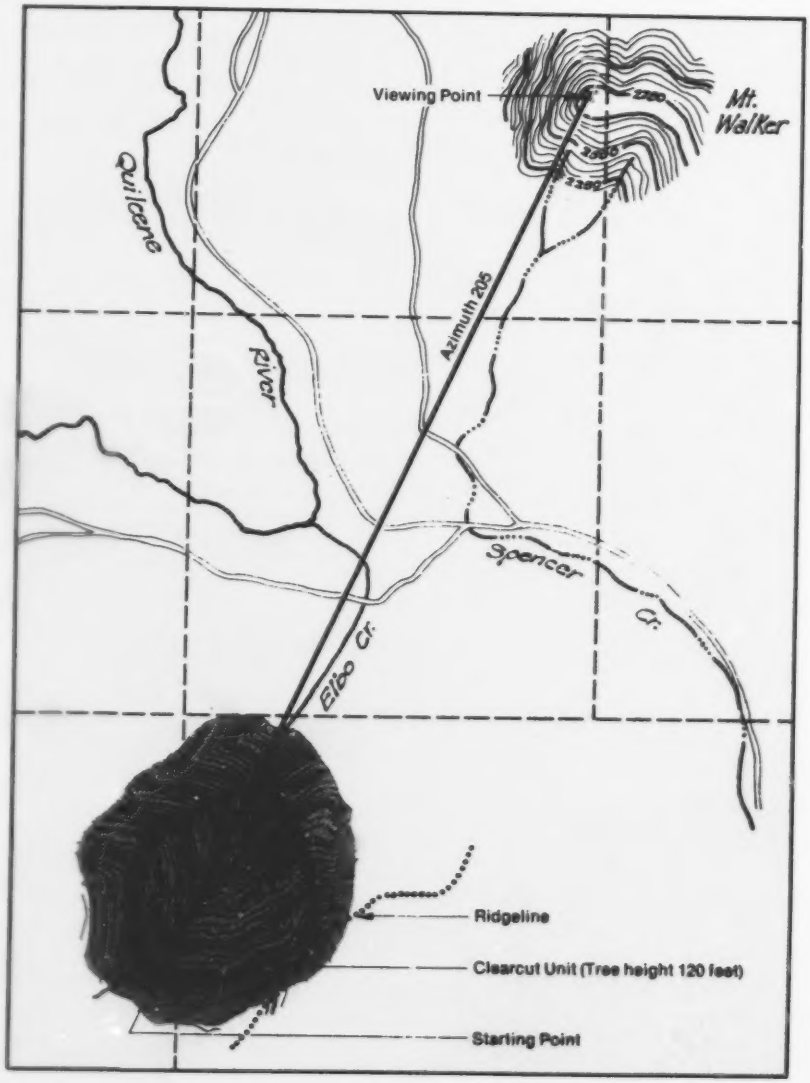
To produce a perspective plot of a proposed clearcut unit, a contour base map similar to figure 1, including the following information, is needed.

1. Proposed clearcut unit boundary
2. Critical viewing points
3. Key ridge lines
4. Starting points for digitizing units
5. Azimuth from viewing point to the first point on cutting unit
6. Tree heights.

Essential information from the base map is resolved into numeric coordinates by the digitizer, and transmitted to the computer for analysis. The result, a perspective plot, is graphically displayed on the plotter. The numeric coordinates are retained in memory for automatic replotting of the initial unit from various other viewpoints.

*U.S.D.A. Forest Service General Technical Report PNW-71, 1978.

Fig. 1. Base Map.



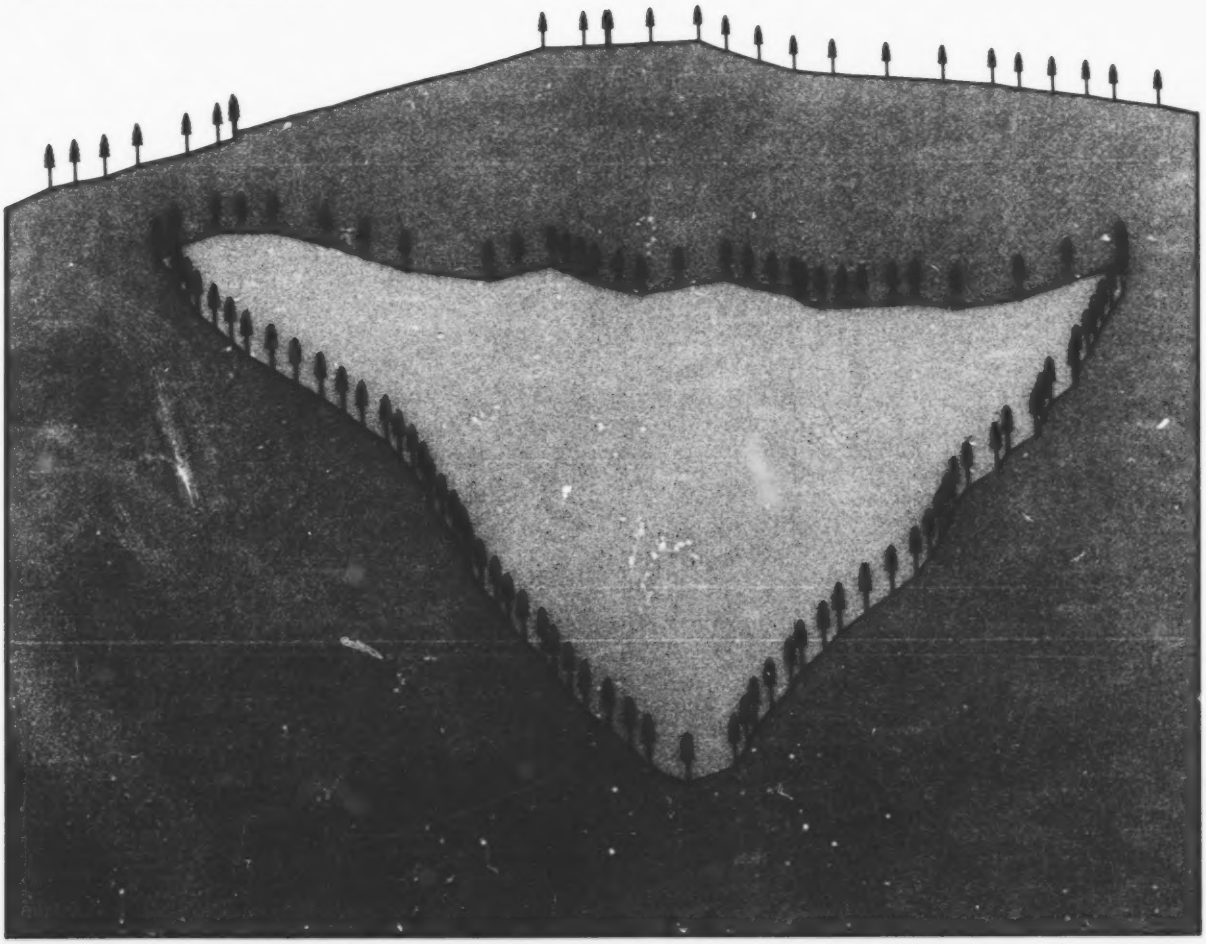
Output

The primary outputs of this program are the perspective plots. Figure 2 represents a sample of this output. It was generated from the base map data of figure. 1.

A special feature of Perspective Plot's output is that trees are only plotted at digitized points, and these points are generally digitized only at locations where contour lines cross the unit boundary. Note in figure 2 that trees appear more widely spaced along the upper part of the unit where the boundary does not intersect as many contour lines. The user of the program, however, can easily learn to relate the plot to reality.

Perspective Plot does provide output which, in spite of some artificiality, represent an accurate picture of clearcut units. Once the characteristics of the output are understood, the user can accurately determine a unit's shape and visibility from key viewing points.

Fig. 2. *Perspective plot of clearcut unit.*



Appendix 4
Visual Absorption Capability (VAC)

(The following is partly based on a detailed landscape analysis of the Cheakamus River–Whistler Corridor, carried out by T. L. Barratt in 1980).

Landscapes are capable of absorbing changes to varying degrees. Visual Absorption Capability (VAC) is a measure of the ability of the landscape to absorb alteration of its physical character without damage to its scenic value. The use of this factor is important in making landscape management decisions and during the design and lay-out of cutblocks.

The following example of a Visual Absorption Capability inventory was prepared for the Cheakamus design unit and the Whistler design unit.

Three factors were used to determine the Visual Absorption Capability:

- Slope Class
- Vegetative Pattern Diversity
- Soil Productivity

Slope Class (Map 4, fig. 1)

Slope is the most significant VAC factor.

Slope Class	VAC Rating
Above 60%–Steep	Low
30–60%–Medium	Medium
0–30%–Gentle	High

The Whistler landscape is a composite landscape of a broad valley and narrow canyons. There is considerable variation in slope within the visible landscape.

Vegetative Pattern Diversity (Map 4, fig. 2)

An unbroken canopy cover has a low VAC. Broken or open landscapes with colour and species variety have inherently higher VAC; management activities can be designed to blend with the existing natural patterns.

Vegetative Pattern Diversity	VAC Rating
Dense cover	Low
Few openings, colour, species, variety	Medium
Many openings, colour, species variety	High

The Whistler landscape contains considerable variety in canopy cover – closed, open and broken – the result of man's activities within the natural forest environment. Vegetative pattern diversity is the most difficult factor to assess. It is largely a subjective judgement.

Soil Productivity (Map 4, fig. 3)

Soil productivity, or site class, reflects vegetation growth and thus regeneration potential. Land of high growing capacity revegetates early and through quick green-up has a high visual absorption capability. Conversely, poor soil conditions reflect slow green-up and low VAC.

Soil Productivity	VAC Rating
Poor Site Class	Low
Medium Site Class	Medium
Good Site Class	High

With the variety in topography and drainage in the Whistler landscapes, there is variety in soil fertility, soil depths and growing conditions.

Visual Absorption Capability Composite (Map 4, fig. 4)

When the VAC maps are overlaid, the emerging values create a composite VAC map in which the values of slope, vegetative pattern diversity and soil contrast are equally weighted.

Application

The three VAC ratings provide:

- an identification of the opportunities for meeting Visual Quality Objectives
- a relative base for selecting areas for treatment
- a data base demonstrating the location and extent of factors affecting the visual success of a proposal
- additional information needed to make decisions on road locations, facility siting and cutblock location, shape and size.

On-site observation is necessary to refine and aid the application of the Visual Absorption Capability data.

In addition to the factors described (Slope Class, Vegetative Pattern Diversity and Soil Productivity Rating), there are others that influence the Visual Absorption Capability of a landscape. Diversity of landforms, soil and rock colour and lines and angles also contribute to VAC ratings.

The illustrations that follow explain the VAC principle as it applies to certain landscapes in British Columbia.

MAP 4

Fig. 1

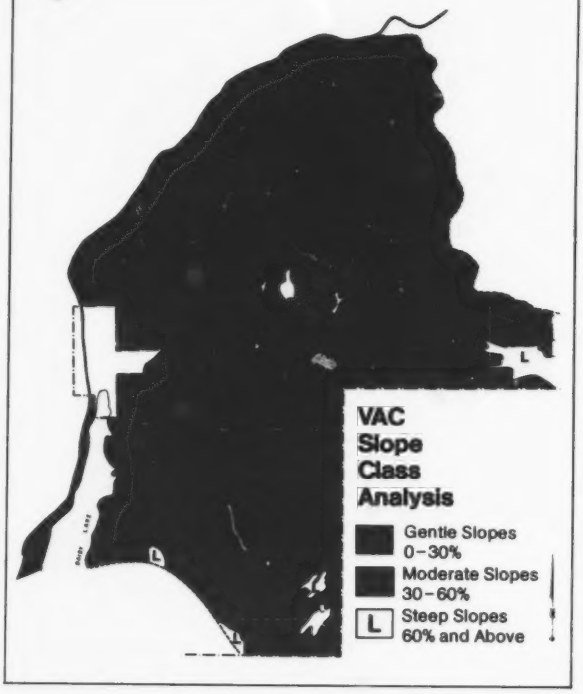


Fig. 2

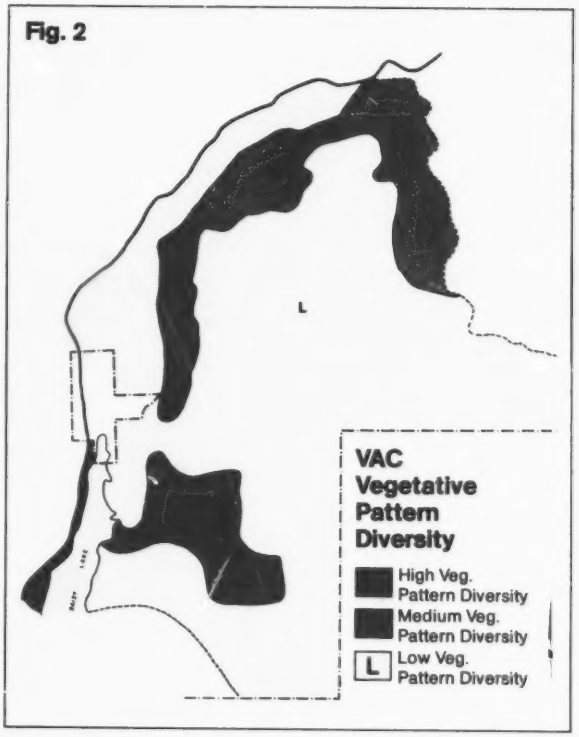


Fig. 3

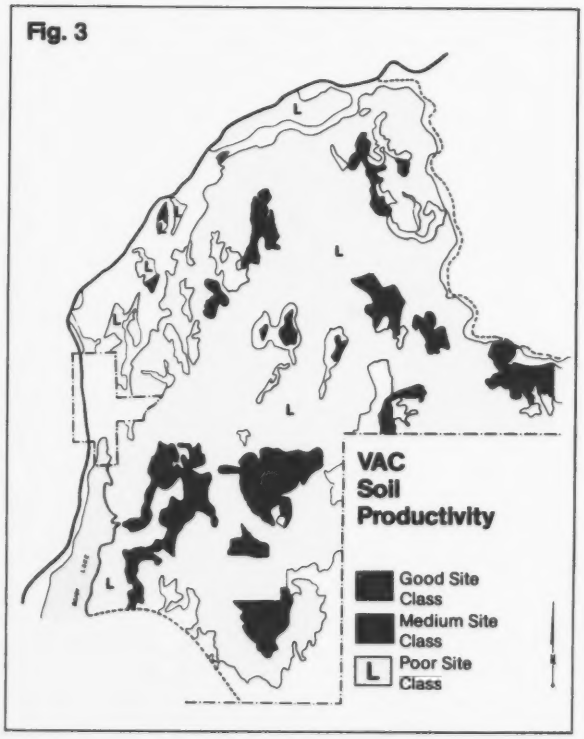
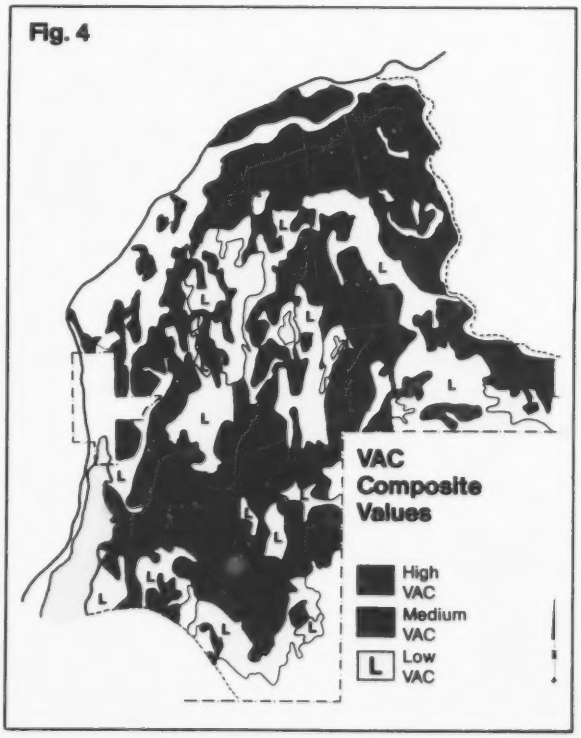


Fig. 4



Pemberton, Vancouver Region.
Diverse landforms and rapid green-up potential give this landscape a high VAC.

The VAC on the gentle slope is medium during the summer, particularly in relation to the colour of the mountains in the background.

A steep slope and strong colour contrasts of forest and rock, as seen in the roads, provide a low VAC; curved boundaries and indistinct angles would make this cutblock a less severe modification. Rehabilitation through boundary change could mitigate the visual impact on the landscape.

The powerline right-of-way to the far left is not being absorbed by the landscape, but in the foreground the vegetation pattern diversity, rapid green-up capacity and partial screening make the power poles barely visible. (High VAC)

Whistler, Vancouver Region.

Golden, Nelson Region

Although steep slopes usually have a low VAC, these illustrations show: ***In Summer,*** *a fairly high VAC because of a high vegetation diversity and green-up capacity; also, there is a successful blending of the cutblock in the landscape.*

In Winter, *a high VAC because naturally dominant lines and forms absorb the lines and shape of the cutblock. The very distinct "white triangle" of the cutblock seems to match the dominant snow covered triangles of this mountain scene.*

Summerland, Kamloops Region. *Varying slopes and vegetation, landform diversity and a broken forest canopy give certain Okanagan landscapes a high VAC. Careful planning allows alterations without seriously affecting scenic values.*

Appendix 5
The Use of Computers

This appendix provides background information on computer science available for Forest Landscape Management purposes.

Very effective computer technology is now available, and the forest manager is encouraged to keep informed about its development and practical use. At the same time, managers must realize that this technology is too expensive to be applied indiscriminately in situations where it is not justified.

The Use of Computers in the Visual Analysis of Landscape Alterations

*Mark Angelo**

Introduction

Over the past two decades, conservation groups have dealt with the field of landscape aesthetics in varying ways. Initially, they tended to pursue their interest under the general heading of "outdoor recreationists." Later, their focus shifted towards the rather broad, all encompassing term of "environmental quality" (3). This seemed to be the start of the ecological movement and, from this point on, the public's awareness of, and concern over, aesthetic values was increasingly expressed.

To many, however, landscape forestry is an obscure field, and conservation groups, in an attempt to garner greater public acceptance, have sometimes chosen to concentrate on more tangible issues such as stream pollution and habitat destruction. Yet, the literature on aesthetics has bloomed, and managers all over the country are becoming increasingly more accountable for the visual impacts they create.

In response to this, land managers have steadily improved upon their ability to manage the visual resource. However, improved accessibility to computer technology has been largely responsible for recent advances in the areas of landscape inventory and predictive analysis. Such advances now enable resource specialists to quantify and assess aesthetic values, and this has helped to make the previously vague field of visual management an applied science in many parts of North America.

Portrayal Applications

If a land-use planner accepts the fact that he is working in a visually sensitive area (i.e., by scenic highways, parks, townsites, etc.) perhaps the most difficult thing for him to assess is how the landscape will appear after proposed modifications are implemented. Yet, this is something that is frequently demanded of him by the public and, until recently, managers often found themselves having to depend on sketches, scale models and other methods that proved to be both inaccurate and unreliable.

Fortunately, this has now changed with the recent development of several computer programs that are capable of portraying visual effects of proposed landscape alterations. Such portrayal data allow managers to predict, and subsequently reduce, adverse visual consequences and, depending on the program, output can be displayed with or without photomontage.

An excellent example of a system utilizing photomontage is MOSAIC, a program originally funded by both the U.S. Forest Service and the Aerospace Corporation of California. This approach combines photographic and computer graphic techniques, and offers a fast, accurate and low cost look at land-use proposals before they are implemented.

*British Columbia Institute of Technology, Burnaby, B.C. V5G 3H2.

The basic operational steps of MOSAIC are as follows:

1. the modification design, camera location and reference points are designated on a topographic map.

2. the topographic data of the area are digitized.

3. a photograph of the area, in its present state, is taken from the same camera location referred to in step 1 (so that the camera field of view exactly aligns with the computer data).

4. all data are entered into the computer, and then validated.

5. the computer generates a plot of the alternative that can be placed directly over the photograph.

6. an artist retouches the resulting photomontage for appropriate colour and texture. (4).

A second method of displaying portrayal output is the production of perspective views that do not utilize photomontage. Among these systems are the PREVIEW and Perspective Plot programs presently in use on many of the National Forests in the Western U.S. These programs are also being used, on an increasing basis, along the lower coast of British Columbia.

Once again such programs involve the digitizing of a topographic map, the incorporation of vegetation data, the delineation of the proposed modification, and the designations of selected viewing points.

Unlike the photomontage technique the graphics produced from these programs include computer representations of various cover types and, if desired, can illustrate the regeneration of vegetation at different stages.

Inventory Approaches

In addition to portrayal applications recent computerized techniques can also be applied to the inventory aspect of visual resource management. For example, programs such as VIEWIT are capable of delineating the terrain visible from both single and multiple observer points. VIEWIT can also be used to prepare slope and aspect data, and is capable of analyzing "seen-areas" in relation to their respective distances from various observer points (2). Elevation profile charts for different areas can also be produced and all data are displayed in either tabular or overlay map form.

The basic input needed to utilize VIEWIT is simply a grid of elevation points representing the specific area of interest. Once this is obtained, the user defines the required form of elevation data he needs, and subsequently, tables and maps illustrating the desired results are produced (2).

There are numerous land-use situations in which such programs can be useful. For instance, if logging is to occur by a scenic highway, land managers may wish to determine those areas that are visible from different points along the road. Utilizing VIEWIT, this information could then be weighted against "viewing distance" and "times-seen" data, and a sensitivity ranking for visual impact could be developed.

Following this, planners may choose to generate slope-class maps from the same program to determine those areas along the highway that are most conducive to tractor logging. This output could then be combined with the aspect option (and other data) to determine areas most suitable for natural regeneration.

There are certainly other applications of VIEWIT to timber harvesting that could be discussed, and program users may find that they are limited only by their imagination. However, it is important to note that these computer techniques can be applied, just as effectively, to other landscape modifications such as utility corridors, ski hills, roads, and mining developments.

Conclusion

Many timber stands, in visually sensitive areas, are not being harvested for want of a visually acceptable management plan. These stands are seldom static however, and such an approach, over time, may prove to be biologically unsound. In other areas, standard timber practices have totally disregarded aesthetic values. This has resulted in adverse visual impacts and subsequently, a great deal of public outcry and criticism.

In an attempt to avoid such situations, various descriptive and psychometric approaches to landscape planning have been developed in recent years. In conjunction with these approaches, the use of computer technology, as an aid, has greatly increased the manager's ability to analyze and manage the visual resource. Granted, inherent weaknesses still exist in many of the programs now in use. Yet, these are generally minor, and, at a time when public input into the land-use decision making process is becoming mandatory, managers should have immediate access to the kind of data such programs are capable of providing.

References

1. Angelo, Mark. 1979. *Using computer graphics in the visual analysis of the Sunshine Ski Area expansion. Proc. Conference on Applied Techniques For Analysis and Management of the Visual Resources. U.S.F.S. Incline Village, Nevada, April 23-25.*

2. Elsner, Gary., Michael Travis, Wayne Iverson, Christine Johnson, 1975. *VIEWIT: computation of seen areas, slope and aspect for land use planning. U.S.F.S. Pac. S.W. For. and Range Exp. St.*

3. McCloskey, Michael. 1979. *Litigation and landscape esthetics. Proc. Conference on Applied Techniques For Analysis and Management of the Visual Resource. U.S.F.S. Incline Village, Nevada, April 23-25.*

4. MOSAIC, *A system for displaying proposed landscape modifications, 1979. U.S.F.S. Summary, Intermountain For. and Range Exp. St.*

Preview

Myklestad E., and J. A. Wagar, 1976 PREVIEW: Computer Assistance for Visual Management of Forested Landscapes. U.S.D.A. Forest Service Research Paper NE-355.

The Authors

At the time this work was accomplished, Erik Myklestad and J. Alan Wagar were, respectively, research technician and project leader of the Environmental Interpretation Research Project formerly maintained by the U.S.D.A. Forest Service in cooperation with the College of Forest Resources, University of Washington, Seattle. Wagar is currently leader of the Recreation Research Project maintained by the Forest Service in cooperation with the State University of New York College of Environmental Science and Forestry, Syracuse.

Abstract

The Preview computer program facilitates visual management of forested landscapes by generating perspective drawings that show proposed timber harvesting and regrowth throughout a rotation. Drawings show how changes would appear from selected viewing points and show landscapes as either a grid of distorted squares or by symbols representing trees, clearings, water, rock, etc. Preview can also show roads and other linear features.

Preview requires digitized data for uniformly spaced points in a grid of up to 100 columns and 80 rows. For distorted square drawings, only elevations are needed. For drawings with symbols, data must also include vegetation or surface type codes and, when appropriate, tree heights. At a spacing of 100 feet between adjacent points, the maximum (100 x 80) grid covers approximately 2.9 square miles.

In addition to the cost of preparing data, computer and plotter costs are incurred. These depend on the computer and plotter used, the size of the grid, the number of points visible from the viewing point, and the density of symbols used. Computer (CDC 6400) and plotter (Calcomp 936) costs were approximately $16 for a drawing that plotted vegetation and ground cover symbols for approximately 2,300 visible points from a data grid of 7,200 points embracing 1,653 acres.

Preview is controlled by a series of instruction cards that specify data entries, viewing point(s), angle(s) of view, drawing center point(s), scale of drawing(s), rates of tree-growth, normal and shelterwood tree densities, representation as distorted-square or vegetation and surface-type symbols, and year(s) after beginning of rotation.

Viewit

Travis, M. R., G. H. Elsner, W. D. Iverson and C. G. Johnson., 1975 Viewit: Computation of Seen areas, Slope and aspect for land-use planning. U.S.D.A. Forest Service, General Technical Report PSW-II.

This user's guide provides instructions for using Viewit – a computerized technique for delineating the terrain visible from a single point or from multiple observer points, and for doing slope and aspect analyses. Results are in tabular or in overlay map form. Viewit can do individual view-area, slope, or aspect analyses or combined analyses, and can produce elevation profile charts between any two points in a study area. The guide explains how to prepare data, select available options, and interpret results. Viewit is designed to operate on a Univac 1108 computer with Exec-8 operating system. The Viewit system is accessible via remote terminals to the U.S.D.A. Fort Collins Computer Center. For those not having access to this computer facility, the programs are available on request to: Director, Pacific Southwest Forest and Range Experiment Station, P.O. Box 245, Berkeley, California 94701, Attention, Computer Services Librarian. The programs will be copied on a magnetic tape to be supplied by the requestor.

Perspective Plot

Twito, R. H. 1978, Plotting Landscape Perspectives of clearcut Units. U.S.D.A., Forest Service. General Technical Report PNW-71.

Abstract

The esthetics of clearcut units potentially visible from a distance can be improved by judicious design. Screening clearcuts from view or shaping them to characterize natural openings are current methods used for this purpose.

Perspective plots illustrating how proposed clearcut units will look from specific off-site viewing points provide an appropriate means of evaluating how well the units meet desired visual objectives. This procedure has been automated on a desk-top computer system using digitizer, plotting peripherals, and topographic maps. The explanations, listings, and logic are included in this report.

For a more detailed application of this method see appendix 3, pages 83 and 84.

References

Canada

Angelo, M., 1979 The Use of Computer Graphics in the Visual Analysis of the Sunshine Ski Area Expansion. B.C. Institute of Technology.

Carr, W. 1980 A Handbook for Forest Roadside Erosion Control in British Columbia. Ministry of Forests, Land Management Report Number 4.

Cottell, P. L., B. A. McMorland and G. V. Wellburn., 1976 Evaluation of Cable Logging Systems in Interior B.C. and Alberta. Forest Research Institute of Canada (FERIC), Technical Report TR-8.

*Dearden, P.** 1978 A Statistical Technique for the Evaluation of the Visual Quality of the Landscape for Land-use Planning Purposes (from Ph.D. dissertation, University of Victoria).

*Present address: Department of Geography, University of British Columbia, Vancouver, B.C., Canada.

Dooling, P. J., 1974 The Golden Circle; Research into the scenic and recreation values of the Travel Corridor of Northeastern British Columbia. Prepared for Parks Branch, Department of Recreation and Conservation, Victoria, B.C.

Dooling, P. J., and S. Sheppard. 1975 Visual Resource Management and Visitor Reactions to Timber Harvesting, a Bibliography with Abstracts. Recreation Land Use Review, Report No. 6, University of British Columbia.

Farley, A. L., 1979 Atlas of British Columbia; People, environment and resource use. The University of British Columbia Press.

Forest Engineering Research Institute of Canada (FERIC). 1976 Handbook for Ground Skidding and Road Building in British Columbia. FERIC, Vancouver, B.C.

Fraser, B., Public Involvement Handbook. Ministry of Forests (to be published).

Howe, Stansbury and Associates Ltd. 1973 Design Guidelines for Forest Management. Ontario Ministry of Natural Resources, Toronto, Ontario.

Hughes, R., 1978 Radial Line Plotting, a technique for Visual Analysis. Ministry of Forests. Limited distribution.

Ministry of Environment, Terrestrial Studies Branch (formerly Resource Analysis Branch). 1980 Esthetics and Visual Resource Management for Highways, sponsored by the Ministry of Transportation, Communications and Highways. Limited distribution.

Moore, M. K., 1977 Factors Contributing to Blowdown in Streamside Leave Strips on Vancouver Island. Ministry of Forests, Land Management Report Number 3.

Moore, M. K., (Revisions by G.C. Archdekin). 1980 Streamside Management, A Decision-making Procedure for South Coastal British Columbia. Ministry of Forests, Land Management Handbook Number 1.

Murtha, P. A.,1975 Appraisal of Forest Aesthetic Values: An annotated Bibliography.

Rennie, P., 1980 Meares Island Visual Resource Study, submitted in partial fulfillment of the requirements for the master of Landscape Architecture degree. (Guelph, Ontario).

Sauder, B. J., and M. M. Nagy., 1977 Coast Logging: Highlead versus Long-Reach Alternatives, Forest Engineering Research Institute of Canada (FERIC), Technical Report No. TR-19.

Tetlow, R. J., and S. R. J. Sheppard., 1977 Visual Resources of the Northeast Coal Study Area 1976–1977. Resource Analysis Branch, Ministry of the Environment.

Yeomans, W. C., 1977 Proceedings: Visual Analysis Workshop, Parksville, B.C. Resource Analysis Branch, Ministry of the Environment.

Yeomans, W. C., 1977 Spallumcheen: The Visual Environment, B.C. Land Commision.

Great Britain

Crowe, Sylvia, D. B. E., 1978. The Landscape of Forest and Woods, Forestry Commission Booklet Number 44, London: Her Majesty's Stationery Office.

United States

Litton, R. Burton Jr. 1968 Forest Landscape Description and Inventories, U.S.D.A. Forest Service Research Paper PSW-49.

Litton, R. Burton Jr. 1973 Landscape Control Points, U.S.D.A. Forest Service Research Paper PSW-91.

Litton R. Burton Jr. and R. J. Tetlow., 1978 A Landscape Inventory Framework: Scenic Analyses of the Northern Great Plains. U.S.D.A. Forest Service Research Paper PSW-135.

Myklestad E., and J. A. Wagar., 1976 PREVIEW: Computer Assistance for Visual Management of Forested Landscapes. U.S.D.A. Forest Service Research Paper NE-355.

Stone, E. H. II., 1978 Visual Resource Management, American Society of Landscape Architects, Latis Pub. Vol. 1, No. 2 Washington D.C.

Travis, M. R., G. H. Elsner, W. D. Iverson and C. G. Johnson., 1975 Viewit: Computation of Seen areas, Slope and aspect for land-use planning. U.S.D.A. Forest Service, General Technical Report PSW-II.

Twito, R. H. 1978, Plotting Landscape Perspectives of clearcut Units. U.S.D.A., Forest Service. General Technical Report PNW-71.

U.S. Department of Agriculture, Forest Service, National Forest Landscape Management:

1973 Vol. 1 Agriculture Handbook – Number 434.

1974 Vol. 2 Ch. 1 (The Visual Management System) – Number 462.

1975 Vol. 2 Ch. 2 (Utilities) – Number 478.

1976 Vol. 2 Ch. 3 (Range) – Number 484.

1977 Vol. 2 Ch. 4 (Roads) – Number 483.
1980 Vol. 2 Ch. 5 (Timber) – Number 559.
U.S. Government Printing Office, Washington, D.C.

U.S. Department of Agriculture, Forest Service, 1972 Forest Landscape Management, Volume One, Northern Region.

U.S. Department of Agriculture, Forest Service, 1976 Measuring Scenic Beauty: A Selected Annotated Bibliography. General Technical Report RM-25.

U.S. Department of Agriculture, Forest Service, 1979 MOSAIC, A System for displaying proposed landscape modifications. Intermountain Forest and Range Experiment Station.

U.S. Department of Agriculture, Forest Service, 1979 Proceedings of OUR NATIONAL LANDSCAPE, General Technical Report PSW-35.

Warner J., and D. Nickerson, 1977 SCOPE, a Landscape Design Aid. U.S.D.A. Forest Service, Portland, Oregon.

Glossary

Aesthetic(s)
(a) Generally, the study, science, or philosophy dealing with beauty and with judgements concerning beauty.
(b) Giving visual pleasure.
(c) The theory of perception or of susceptibility.

Background
The distant part of a landscape, picture, etc.; surroundings, especially those behind something and providing harmony or contrast; surrounding area or surface. Area located from 3–5 miles to infinity from the viewer.

Blending
Combining into an integrated whole.

Characteristic
That which constitutes a character; that which characterizes; a distinguishing trait, feature, or quality; a peculiarity.

Characteristic Landscape
The naturally established landscape within a scene or scenes being viewed.

Contrast
(a) Diversity of adjacent parts, as in color, tone, or emotions.
(b) The closer the juxtaposition of two dissimilar perceptions, in time or space, the more powerful the appeal to the attention.

Design
A deliberate plan or scheme to arrange elements in such a manner that a desired pattern results.

Detailed Landscape Analysis
A relatively intensive reconnaissance of a landscape or parts of a landscape.

Distinctive
Clearly marking a landscape or landscape feature as different from others.

Dominant Elements
Form, line, color, and texture. They are the visual recognition parts which make up the characteristic landscape.

Focal
Drawing attention to a central item of interest.

Foreground
The detailed landscape found within 0 to ¼–½ mile from the observer.

Forest Landscape
Landscape in which the forest is the most dominant component.

Green-up
The process of re-establishment of vegetation following logging; usually herbaceous growth and deciduous trees appear first, followed by conifers.

Landscape
A portion of land that the eye can see in one glance.

Landscape feature
A distinct or outstanding part, quality or characteristic of a landscape.

Landscape Inventory
A record of visible landscapes, landscape features and an estimate of landscape sensitivity.

Landscape Management
The assessment, evaluation, design and manipulation of a landscape.

Landscape Sensitivity
Degree of landscape quality based on physical and viewer related factors.

Landscape Unit
An area indicating landscape similarity.

Matching
Harmonizing of visual impressions through manipulation of line and form.

Middleground
The space between the foreground and the background in a picture or landscape. The area located from ¼–½ to 3–5 miles from the viewer.

Modification
A Visual Quality Objective meaning man's activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

Monotony
Complete repetition; tedious sameness.

Panoramic
An unobstructed or complete view of a region in every direction; hence a complete and comprehensive view.

Perception
(a) Man's impression of an object or space as based on past and/or anticipated experiences.
(b) Making oneself aware of all conditions and applicable factors; comprehension.

Preservation
A Visual Quality Objective that provides for ecological change only.

Rehabilitation
A short-term management alternative used to return existing visual impacts in the natural landscape to a desired visual quality.

Repetition
Units all the same in interest and ability to attract attention, or at least the same throughout in some characteristic.

Retention
A Visual Quality Objective which in general means man's activities are not evident to the casual forest visitor.

Screening Effect
The result of hiding, restraining or protecting.

Scruffiness
Something shabby, worthless, contemptible.

Selective Logging
The partial removal of trees within a forest.

Sequence
A continuous or connected series.

Shape
Spatial form, often two-dimensional.

Silvicultural Practices
Activities that relate to and promote the rate and quality of tree growth.

Snag
Dead tree.

Variety
An intermixture or succession of different things, forms, or qualities.

View
Something, especially a broad landscape or panorama, that is looked toward or kept in sight; the act of looking toward this object or scene.

Viewpoint
Location from where a landscape can be seen.

Visible Landscape
The total landscape that can be seen from a viewpoint or a number of viewpoints.

Vista
A confined view, especially one seen through a long passage, as between rows of houses or trees. A vista is often toward, or focuses upon, a specific feature in the landscape. Unlike a view, the vista is sometimes man-created and, if it is, is thereby subject to design.

Visual
A mental image attained by sight.

Visual Absorption Capability (VAC)
The relative ability of a landscape to accept management manipulations without significantly affecting its visual character.

Visual Impact
A strong expression experienced by what is seen.

Visual Quality Objective (VQO)
A desired level of excellence based on physical and sociological characteristics of an area. Refers to degree of acceptable alteration of the characteristic landscape.

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